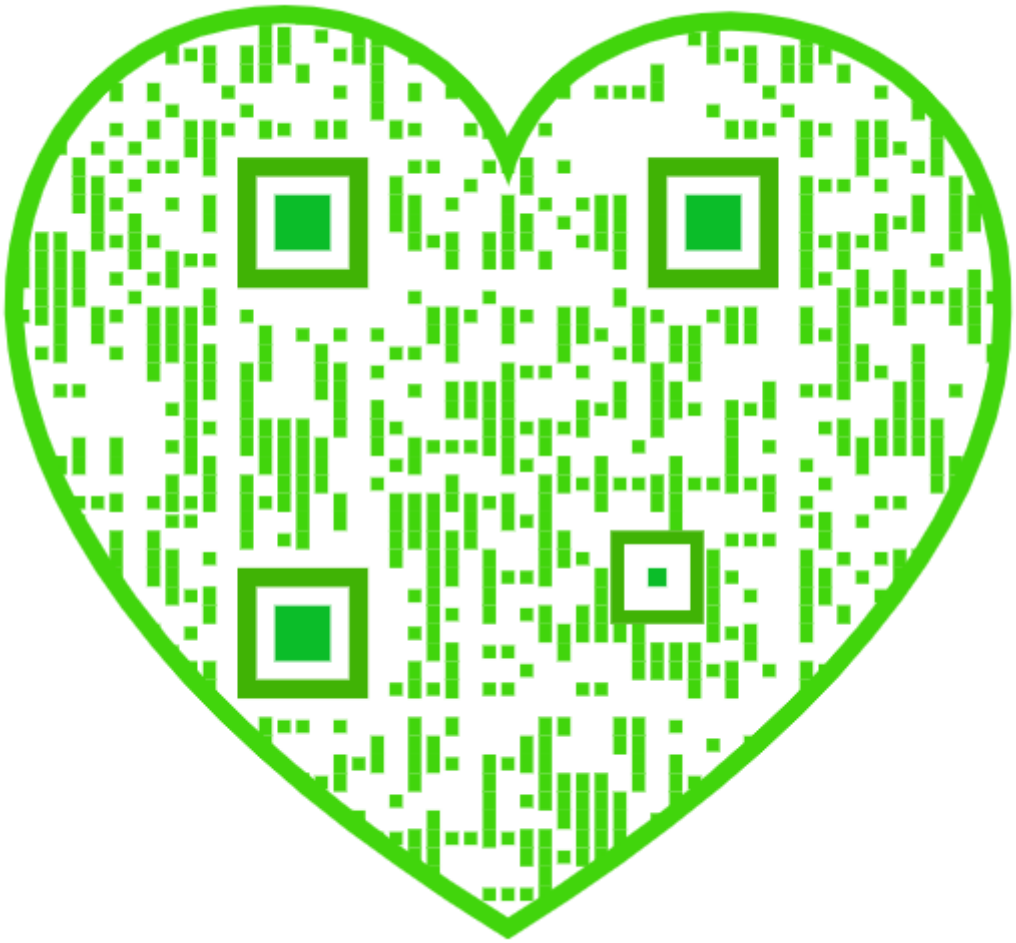

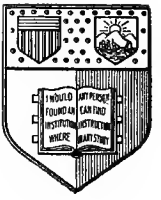

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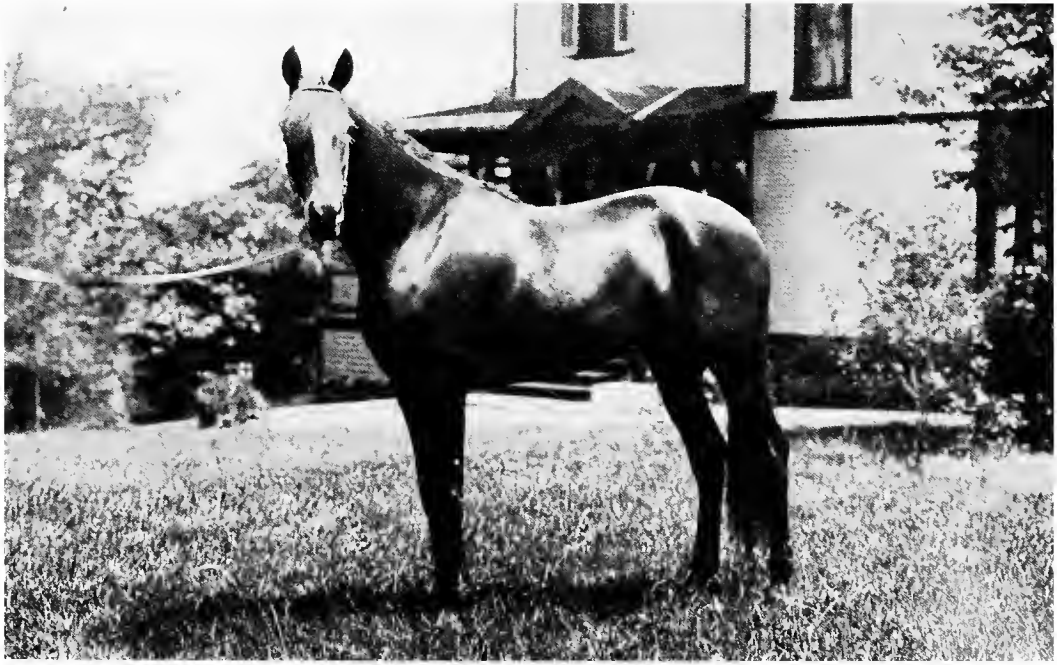

FIG. 1.—THE AMERICAN STANDARDBRED HORSE

This breed of trotting and pacing horses is the outgrowth of the American people's love for stylish driving horses.

Management *and* Breeding of Horses

185

By

Merritt W. Harper

Professor of Animal Husbandry
in the New York State College of Agriculture
at Cornell University

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PREFACE

This book is an attempt at arranging information useful to the farmer, breeder and student. It is the outgrowth of experience both as a practical horse breeder and an instructor. The book includes a discussion of the economic usefulness, judging and allied subjects, early history, a study of the breeds, breeding, feeding, care and management of both horses and mules. Special emphasis is placed on the management of the brood mare as well as that of the colt from the time the mare is bred until the colt is ready for farm work or the market. This includes a discussion of the methods of training, overcoming undesirable habits, fitting, harnessing and the like.

Because of the increasing popularity and field of usefulness, the mule is given prominence. This necessitates a consideration of the several breeds of jacks, as well as special suggestions on the care and development of the mule-breeding jack, as not all jacks are suitable for siring mules.

In choosing the subject matter a wide search has been made and it has been necessary to eliminate much valuable data, as there is quite an accumulation of material upon the production, care and use of the horse. In this elimination, the author has attempted to keep in mind the needs of the farmer, breeder and student.

The arrangement of the subject matter in a book of this class is important. The outline employed has been chosen because in experience it seems the most favorable for the presentation of the text. Following a discussion of judging considerable space is given to the history and development of the several breeds of horses, each breed being discussed in a separate chapter. Farmers and

breeders are interested in the history and description of the breed with which they are working. Possibly they may not care for the detailed description of the other breeds and may wish to proceed with the breeding, feeding, care and management. The subject matter has been arranged with this thought in mind. On the other hand, the student of horse breeding is interested in a comparative breed study and no doubt will wish to consider each breed. In this breed study, the several breeds have been arranged in sequence, as far as possible, and not in order of importance. This is necessary, as some of the older breeds were important factors in forming the more recent ones.

To facilitate a comparative breed study and to promote interest in correct type, many photographs of horses of the various breeds have been used. Untouched photographs have been employed, as they show natural characteristics.

Realizing the many difficulties that present themselves in the management and breeding of horses, the writer will be glad to correspond with those into whose hands the book may fall concerning such difficulties, and also to receive suggestions that will make the book more useful as a practical guide and text.

M. W. HARPER.

Cornell University,
Ithaca, N. Y., August 6, 1913.

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CHAPTER I

THE HORSE AND HIS MASTER

For many centuries the horse has been the sturdy and esteemed servant of man. There is no more interesting and important subject for our study than the origin, development and improvement of the various breeds of the domestic horse. He is the noblest of all creatures that we have subdued to our will. His acquisition has been one of the chief factors in the rise and supremacy of the great nations of ancient, medieval and modern times. We have no history that is not intermingled with his. In all the ages he has occupied an important position. This is especially true at the present time. The foundation of our civilization rests on agriculture and our agriculture rests on the horse.

Saving human time.—In America we have learned to substitute brute force for human energy to a greater extent than any other country. The Thirteenth Census shows the horse and mule population of the United States to be approximately one-fourth that of the human population. In other words, the United States possesses four inhabitants for each beast of burden—horse or mule; whereas France possesses ten inhabitants, Germany twelve, and England twenty-four inhabitants for each beast of burden. Those who settled and developed our country were early taught that human muscle was the most expensive material from which to procure energy, even though the person be a slave. Human muscle, however cheap, cannot successfully compete with improved implements operated by well-bred horses adapted to their work and directed by intelligent workmen.

As a nation we are extremely saving of time, but wasteful of everything else. We have destroyed our forests,

wasted our coal and soil fertility; but we have used human energy more economically than it has ever been used before. The older nations are saving of everything but human time. Our extensive use of the horse has greatly influenced our national character and history. Because we make our labor count for so much, we are able to make farming an attractive business rather than a peasant's drudgery.

FIG. 2.—SAVING HUMAN TIME. PLOWING THE SOIL

Horse labor and man labor.—The horse, properly directed, is equal in productive energy to ten men, and it will cost about one-half as much to keep him as one man. Hence a horse intelligently handled may be made to cheapen labor twenty fold over the old hand method. Here lies the secret of success in America. The American farmer is not, as a rule, contented to direct the energies of but one horse at a time. He usually harnesses two, sometimes three or four and even more, to a

single implement or machine. Where the fields are large we frequently see two 16-inch plows mounted on wheels and drawn by four large horses plowing as much as six and even more acres in a single day, more than a hundred laborers could do in a day of the severest toil. A very striking illustration of the economy of horse over man power may be seen in the great wheat fields of California and the Northwest where 14 teams, 28 horses or even

FIG. 3.—SAVING HUMAN TIME. FITTING THE SOIL

more, are attached to a combined machine which cuts, thrashes, cleans and sacks one thousand or more bushels of wheat in a day. One man drives the horses and three others tend the machine and sew up the bags. It would require at least sixty men to accomplish this task in one day with cradle and flail.

Equally as great economy of human muscle is seen in our large cities, where men are displaced by horses in the transportation of heavy merchandise. Because of the

crowded streets only a few horses are hitched together, in this case, to assist a single man; but the horses are large and strong. A single team, consisting of two horses, is able to move a load of four to ten tons over paved streets—a load equal to that carried by a freight car in the early days of steam railways.

The horse cheapens production.—In 1830, it required an average of three hours and three minutes of human labor for each bushel of wheat grown; in 1896 it required

FIG. 4.—THREE GENERATIONS OF THE REAPER

ten minutes. In 1855 it required an average of four hours and thirty-four minutes to grow, harvest and shell one bushel of corn; in 1894 it required 41 minutes.* The heavy, clumsy plow of 1830 has given way to more modern implements, such as the gang plow, disk plow, disk harrow and the like, which both plow and pulverize the soil in the same operation. Hand sowing has been displaced by the mechanical seeder drawn by horses. Hand harvesting with knife and peg, cradling and thrashing with flail has given way to reaping, thrashing and

*Yearbook, United States Department of Agriculture, 1897, page 600.

sacking with the combined reaper and thrasher drawn by horses.

The horse as a pleasure animal.—Not only is the horse of service to us in conserving our energies, but he provides us with health-giving pleasure. There can be no doubt that the horse was used in war and sport many centuries before he began to take up our burdens. This is fully attested by our earliest written history. In fact, the first improvement attempted was to increase the horse's efficiency in war and sport and not in economic

FIG. 5.—A SIX-HORSE TEAM DELIVERING COAL

industry. Breeding horses for sport and fashion constitutes a very large part of the industry at the present time, though this work has been affected to some extent by the automobile.

Number and value of horse stock in the United States.—According to the Thirteenth Census there are 27,618,242 horses, mules and asses in the United States, valued at $3,085,460,483. This value is twenty-eight per cent greater than that of cattle, swine, sheep and goats combined. At least one-half of this horse stock is capable of doing work, which is equal to more than one hundred million hand laborers. This illustrates the vast addition to the wealth and productive power of the nation that we

secure by the intelligent breeding and utilization of the horse, as well as the great economy secured in substituting brute force for human energy. This also illustrates the strength of the horse as an economic animal. Though he has been threatened by the steam car, the bicycle, the electric street and suburban car, by the automobile and the like, he has steadily increased in numbers and value. As a source of power and as a substitute for human labor in combination with machines, the horse's economic place is more strongly established than ever before.

Since the horse is such an economic factor in our production and progress, we should acquaint ourselves with the history and methods of improvement of this most useful and pleasure-giving animal; so that not only good horses may be produced, but that such selection, breeding, feeding and training be practiced as will secure, not only the best horses, but those which shall be best adapted to the work for which they are intended. It is not only unwise but poor economy to grow a horse which will increase man's productive power only fivefold, when a more intelligent effort might have produced one which would increase it ten times.

CHAPTER II

JUDGING A HORSE

The ability to judge a horse accurately is acquired by careful observation, study and experience. Not all of us have the naturally keen observing powers and love for the horse peculiar to some persons, who become notable experts; but each of us may acquire a practical, useful knowledge of the exterior of the horse by methodical and conscientious effort. To become a good judge of horses is well worth our earnest attention. Such an attainment gives us much personal satisfaction as well as the necessary information for use in breeding, feeding, buying, selling and managing horses.

REQUIREMENTS OF A GOOD JUDGE

To become proficient in judging any class of farm animals there are three faculties that should be well developed—familiarity with type desired, powers of observation and good judgment.

The use influences the type.—In judging horses we must first consider the uses for which they are desired and the type or breed that will best accomplish the given purpose. Thus, if the horse is wanted for light harness and fast driving, it would be a mistake to choose an animal of the coach type; or if the object sought is style and high action, it would be none the less a mistake to choose a trotting or pacing horse. The more familiar we are with the demand and the type best suited to meet it, the better our chances of success.

Cultivate the power of observation.—The power of observation should be well developed. We must train the eye to see quickly and accurately, so that there may be no

mistake in the observations that are to form the basis for a conclusion. In addition to seeing things as they are, we should be able to detect deviations from the correct form. This is often difficult. We may be familiar with the fact that a few gray hairs on the inside of the pasterns may indicate that the horse interferes, and yet when we examine him entirely overlook the white hairs. In such cases as this the difficulty is often increased by the horseman attempting to cover up such signs, and this should serve to put us on our guard. Having examined

FIG. 6.—A WELL-EQUIPPED JUDGING PAVILION

the horse carefully we should retain a mental picture of him, as it often happens that we are called upon to judge large rings of animals, and the work can be greatly facilitated if we can remember each animal. Further, retaining such a picture is of value in matching teams.

Efficiency depends on judgment and practice.—After having noted each of the horses to be considered, the judgment is brought into play to decide which should be placed first. In judging horses, efficiency depends largely

on practice and experience. The type or breed to fill a given demand, and the value of the horse for such purpose, are recognized much more quickly and accurately by one who is in practice judging horses than by one who judges only occasionally.

Method of judging a horse.—To examine the horse, we should have him led into an open, well-lighted place and stood at ease. First, we should view him from all directions, noting his general appearance—form, height, weight, action, quality, temperament and the like. To impress these general characters the animal should be moved around, first at the walk and then at the trot. While in action, view him from in front, behind and either side. Second, we should make a careful examination of the detail characters. To facilitate this detail examination the score card was devised.

In judging horses, we should learn to use our eye rather than the hand. The eye is master of the situation and the chief reliance with the expert judge. The hand should be used only as an assistant to the eye, and may be used when the eye unaided cannot determine a question of quality, size, condition or soundness.

THE SCORE CARD

The score card gives, in systematic order, a detailed description of the parts or characters of an ideally perfect animal. It emphasizes the relative importance of the various characters. The score card teaches the method of seeing the parts or characters in a logical, orderly way that none may escape observation. It deals with one animal, comparing it with an ideal.

Purpose of the score card.—It is primarily an aid to the study and teaching of stock judging. It enables us to analyze the various characters of the horse in a logical order. Thus, point by point, we learn to estimate the value of each character that goes to make up the animal.

In time, practice with the score card will enable us rapidly to look over a horse, note his good and bad points and arrive at a correct estimate of his value. After having learned the method of examination, the art of seeing the parts of the animal instead of merely the animal as a whole, and securing an idea of the relative importance of the parts, we are ready to discontinue the use of the card and take up comparative judging.

Using the score card.—Two types of horses have been placed on the same card (p. 11), although the description and the numerical value differs in nearly every character. This has been done to facilitate teaching, as it indicates rather vividly the differences in the light and heavy types. It will be noticed also that the card has been divided into several main divisions, each assigned a numerical value, and these again divided into a number of parts or characters, each of which is described and given a figure which shows the percentage value attached to each particular part.

In scoring a horse first note the part or character critically and if the animal is as nearly perfect as is possible, leave blank the column headed "student's," which means that the part is worth all the card allows. If the character is imperfect, make a "cut," taking away from the numerical value given the part, the percentage which indicates how much it would have to be improved to be perfect. Make the "cut" on the percentage basis; that is, if scoring say the action of a driving horse which is deficient 10 per cent, take 10 per cent of ten, the numerical value given the character, which is 1. Place 1 in the column headed "student's." Continue until all parts have been scored in the order given and the "cuts," if any, recorded. Add the "cuts," which show the total deficiency, subtract this from 100 which gives the score of the animal. By this method we can tell at a glance the parts that are deficient, as they are the only ones marked.

When the work has been completed by the class each

student should correct his card to correspond to that of the instructor, who will then give his reasons for each "cut" made and discuss the merits and demerits of the horse in detail.

Rules for scoring.—In scoring a horse on the percentage basis, it is not considered advisable to make a "cut" of less than 5 per cent. Seldom will a part deserve a "cut" of more than 50 per cent, as an important character deserving more than this is so seriously at fault that it may disqualify the horse. The scorer must use his judgment in deciding the proportionate score to allow between these limits.

STUDENT'S SCORE CARD.

HORSES.

SCALE OF POINTS	For Draft			For Driving		
	Standard	Student's	Corrected	Standard	Student's	Corrected
A. **General Appearance:** Draft 35: Driving 43:						
Age—Estimated.....yrs; actual.....yrs.						
Height—Estimated.....hands; actual.....hands	..	..	..	8	..	..
Weight—Estimated.....lbs; actual.....lbs.	8	..	..	..	..	..
Form, for draft, low, massive, symmetrical; for driving, high, lithe, indicative of extreme activity	6	..	..	4	..	..
Quality, bone, flat; tendons, clean; skin and hair fine	8	..	..	10	..	..
Color, according to breed	1	..	..	2	..	..
Action, step, smooth, quick, long; trot, rapid, straight, regular	4	..	..	10	..	..
Attitude, members vertical	5	..	..	5	..	..
Temperament, lively, pleasant	3	..	..	4	..	..
B. **Head and Neck:** Draft 5: Driving 5:						
Head, lean; length, two-fifths height of withers; width of forehead, more than one-third length of head; depth of head, one-half its length. For driving, smaller, carried higher and more horizontal	1	..	..	1	..	..
Muzzle, fine; nostrils, large; lips, thin; teeth, sound	1	..	..	1	..	..
Eyes, full, bright and intelligent	1	..	..	1	..	..
Ears, short, clean, fine, directed forward, wide apart	1	..	..	1	..	..

SCALE OF POINTS	For Draft			For Driving		
	Standard	Student's	Corrected	Standard	Student's	Corrected
Neck, pyramidal, muscled; throat, clean, fine; windpipe large. Depth of insertion at shoulder equals length of underline 2 to 4 inches shorter than head. For draft, neck shorter, thicker, more horizontal	1	..	..	1	..	..
C. **Forequarters**: Draft 20: Driving 19: Shoulders, long, extending into back; point of shoulder to point of withers, equals length of head. For draft, shorter and more upright	3	..	..	2	..	..
Arms, relatively short, 12 to 13 inches. For draft, more horizontal	1	..	..	1	..	..
Forearms, vertical, long, 14 to 15 inches; wide. For draft, shorter, more heavily muscled	2	..	..	2	..	..
Knees, clean cut, wide, deep; for driving, 3 inches, for draft, 4 inches, strongly supported	3	..	..	3	..	..
Canons, vertical, short, 9 to 10 inches, lean, wide; tendons well detached. For driving, longer	2	..	..	2	..	..
Fetlocks, wide, thick, clean, free from puffiness	1	..	..	1	..	..
Pasterns, angle 45 degrees, fetlock to ground, 7 to 8 inches. For driving, long, sloping; for draft, short, more upright	2	..	..	2	..	..
Feet, round, even size; horn, dark colored, dense; sole concave; bars, strong; frog, large, elastic; heel, vertical, one-half length of toe	6	..	..	6	..	..
D. **Body**: Draft 10: Driving 8: Chest in general, high, long. For draft, wide, half height of horse; for driving, higher	3	..	..	2	..	..
Withers, clearly defined for driving	0	..	..	1	..	..
Breast, for driving, high, projecting. For draft, broad and muscular	1	..	..	1	..	..
Ribs, long, round curvature, wide apart	2	..	..	1	..	..
Back, straight, short, muscular; shoulders, to haunch equals length of head. For driving, longer	2	..	..	1	..	..
Loin, wide, short, thick, strongly joined to hips	1	..	..	1	..	..
Underline, long; for draft, flank low	1	..	..	1	..	..
E. **Hindquarters**: Draft 30: Driving 25: Hips, level, wide in proportion to other parts, for draft, smooth; for driving, more prominent	1	..	..	1	..	..
Croup, wide, long, muscular, 2 to 4 inches shorter than head. For driving, horizontal; for draft, shorter, more oblique	4	..	..	3	..	..
Tail, set and carried high, long, full, fine	1	..	..	1	..	..

SCALE OF POINTS	For Draft			For Driving		
	Standard	Students	Corrected	Standard	Students	Corrected
Thighs, for driving, long, 15 to 16 inches, upright; stifle, deviated outward. For draft, shorter, more horizontal, muscular	3	..	..	3	..	..
Buttocks, heavily muscled, well descended	2	..	..	1	..	..
Gaskins, for driving, long, 14 to 15 inches, upright; for draft, shorter, more horizontal, heavily muscled	3	..	..	2	..	..
Hocks, clean cut, large, straight, deep, for driving, 3 inches, for draft, 4 inches. For draft, wider	6	..	..	4	..	..
Canons, 11 to 12 inches long, otherwise as above	2	..	..	2	..	..
Fetlocks as above	1	..	..	1	..	..
Pasterns as above; angle 60 degrees	2	..	..	2	..	..
Feet, compared with above, more oval, more concave; heels, higher, more separated; walls, more vertical	5	..	..	5	..	..
Total	100	..	..	100	..	..

TYPES OF HORSES

There are two distinct types of horses. The light type, useful for light work and speed, and the heavy type used for heavy draft work. Horses belonging to the former type are usually designated "light horses," while those belonging to the latter are commonly called "draft horses." Light horses are further divided into running, trotting, pacing, saddling, coaching and like classes. Draft horses, likewise, are divided into light, medium and heavy draft classes.

The light type.—There is considerable variation in type among light horses, depending on the purposes for which they are adapted. Thus the trotting horse differs in many respects from the saddle horse, and the running horse has many characteristics unlike either. However,

since horses belonging to the light type are each intended for rather fast and light work, they possess many points in common.

In form the light type of horse is rather tall and the legs long, so that the distance from the chest to the ground is more than one-half the height of the horse from the withers to the ground. The distance from the withers

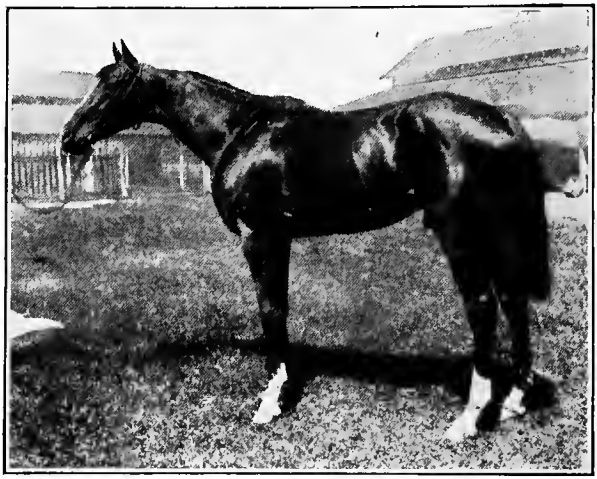


FIG. 7.—LIGHT ACTIVE TYPE

to the knees and from the hips to the hocks is great. In general conformation the light type resembles the greyhound. (Fig. 7.)

The heavy type.—In form the heavy type of horse is low set and the legs rather short, so that the distance from the chest to the ground is about one-half the height from the withers to the ground. The draft horse resembles the bull dog. Weight is important. To pull efficiently the draft horse must possess weight. The draft horse in fair condition at maturity weighs 1,600 to 2,400 pounds, according to the class. (Fig. 8.)

GENERAL APPEARANCE OF A HORSE

In judging the horse first consider the general characters, such as age, height, weight, form, quality, action, attitude, color and temperament.

Age.—Since the age has an important bearing upon the general appearance as well as the various parts of the horse it is placed first on the card. The age, therefore, should be the first character considered (p. 49).

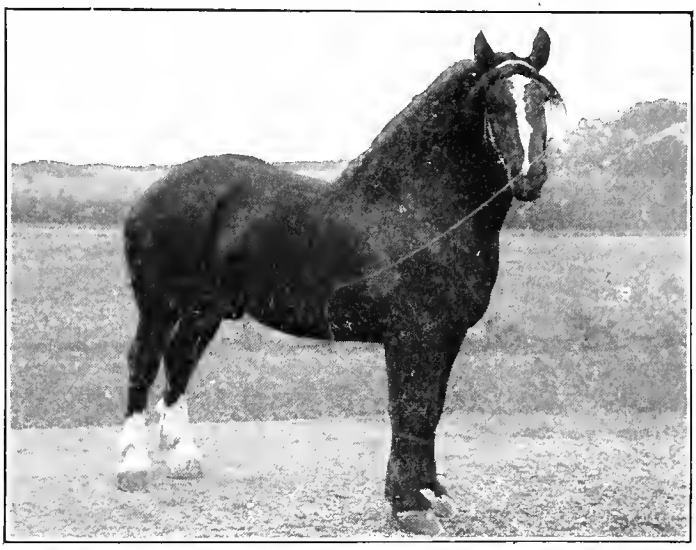


FIG. 8.—HEAVY DRAFT TYPE

Height.—The unit for measuring the height of the horse is a hand—4 inches. The height is taken at the withers. A measuring staff (hippometer), marked off in hands and inches, is used where the accurate height is required. When such is not available, or where absolute accuracy is not demanded, a good way to estimate the horse's height is to "chin" him. Find out how high it is

from the ground to the point of your chin when standing erect. Stand facing the horse close to his left side and note the height of the withers as compared with your chin. Gradually train the eye to estimate height unaided.

In draft horses the desired height is from 16 to 17.2 hands, with the average approximately 16.3 hands. This should be due to depth of body instead of length of leg. In driving horses the height is exceedingly variable, but should be at least 15 hands. This should be due in a large measure to length of leg. The card does not give a numerical value to height in the draft horse for, as a rule, if he is heavy enough he will possess sufficient height. For driving eight points is a perfect score.

Weight.—The draft horse must weigh at least 1,600 pounds. This weight should be due to strong bone, heavily muscled, as well as to large proportions, and not the result of excessive fatness. Weight holds the horse to the ground, enabling him to secure a foothold against which to exert his strength. Weight brought forward is power in itself and the greater the weight to bring forward the greater the power derived from it. This is of so great importance that on the market draft horses are divided into classes according to their weight: Light draft, weighing 1,600 to 1,700; medium draft, 1,700 to 1,800 and heavy draft, 1,800 pounds and up. For the draft horse eight points is a perfect score.

Among light horses, weight is considered of minor importance and no numerical value is given to it on the card, as the horse that meets the height requirement and possesses sufficient action will, as a rule, be heavy enough to fill the demand.

Form.—The draft horse should be broad, deep, massive, evenly proportioned and symmetrical, the entire make-up suggesting great strength and weight. The body should be blocky and compact, with short, broad,

clean, well-set legs showing fine skin, large joints and prominent tendons. Perfect score, six points.

The driving horse should be more upstanding, rather lean, lithe and muscular, having a general appearance of extreme activity. In this type speed and action is desired. Animals of speed possess long bones, long muscles and slightly angular joints. Perfect score, four points.

Quality.—This is a term rather loosely applied and has reference to the hair, skin, tendons, muscles and bones. Good quality is shown by fine, bright, silky hair; soft, pliable skin; clean, well-defined tendons; smooth, well-developed muscles; and strong, smooth bones. Freedom from coarseness in the hair, skin, tendons, muscles and bones emphasizes soundness and guarantees durability. The best way to determine quality is to run the hand down the legs, over the knees, hocks and cannon bones. The hair and skin should feel soft and pliable to the touch and the bones firm and smooth. The fingers should almost seem to touch each other as they pass between the tendons and the bones, especially in the light type, where the tendons are well detached. Soundness also indicates quality (p. 42). Perfect score, eight points for draft and ten for driving.

Action.—While very important, especially at the walk, action is usually considered second to weight in the draft horse. The walk, however, deserves special consideration, since it is the principal gait of the draft horse. It should be regular, straight, level and fast. He should be able to walk four miles an hour with a load. While action at the trot is not so essential, it should not be overlooked, as occasionally draft horses are required to work at the trot. There should be no "paddling," "dishing," or "winging" in or out, "cutting" or "interfering," nor should the forelegs swing out or "roll," or the hindlegs be carried too close together or too far apart. Watch closely for lameness. Good trotting action is not only valuable in itself, but it indicates many other desirable qualities, such

as temperament, conformation and soundness. Perfect score, four points.

Among light horses, there is no single feature held in higher estimation than that of desirable action. Each class of light horses has an action peculiar to itself, that of the high-stepping coach horse differing materially from the trotter, while that of the saddle horse is unlike either. While desirable action varies according to the object sought, the light horse should possess as much as may be displayed and used to advantage. As with the draft horse, good action indicates many other qualities.

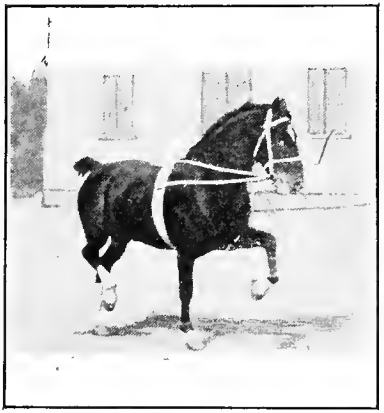


Fig. 9.—Good Action

The walk, in addition to being regular, straight and frictionless, should be fast. This is a point often neglected, and many otherwise good-acting horses are provokingly slow walkers. Action at the trot varies according to the class. In the trotter the stride should be long and not too high; whereas in the coacher a rather high, bold knee-and-hock action is the most sought. In all classes the movement should be straight and regular as viewed from the front, rear and either side. Perfect score, ten points.

Attitude.—This term refers to the position and direction of the horse's legs while standing. The legs should be viewed from the front, behind and either side, and should be formed so as to meet the following requirements: The foreleg, when viewed from the front, should be formed so that a plumb line dropped from the point of the shoulder would divide equally the knee, the cannon

and the foot, leaving between the two front feet an interval almost equal to the width of the hoof in the light type, and somewhat wider in the heavy type; when viewed from the side the line lowered from the elbow joint should pass through the middle of the knee, the cannon and the fetlock and fall a short distance behind the heel. The hindleg, when viewed from behind, should be so formed that a plumb line lowered from the point of the buttock will pass through the middle of the hock, cannon, pastern and foot, leaving between the two hind feet an interval almost equal to the width of the hock. This line should also just touch the back of the hock and the fetlock joint.* Perfect score for draft, five points, and for driving, five points. (Figs. 10, 11.)

FIG. 10.—FRONT VIEW
Correct position

FIG. 11.—REAR VIEW
Correct position

Color.—In scoring a horse the color of the hair should be taken into account. First, because some of the most beautiful colors fade on exposure to sunlight, atmospheric action and the like. Second, because there are many undesirable colors, such as duns, speckled, flea-bitten gray, rusty, leopard spotted and like colors, to which attention should be directed. Perfect score for draft, one point, and for driving, two points.

Temperament.—The horse should show a vigorous, lively, energetic disposition, yet be docile, teachable and intelligent. The temperament is reflected in the action and manners. Horses may be divided into four general classes according to their temper: Teachable, nervous, stubborn and treacherous. The horse with a teachable temper is kind and docile. He is easily taught and

*Exterior of the Horse, Gouboux & Barrier, page 464.

readily adapts himself to various conditions. The horse with a nervous temperament is ambitious and determined. He is quick to learn and acts with all his power, and if properly directed rapidly develops into the best kind of a horse. The horse with a stubborn temperament is willful and difficult to conquer. He is slow to learn and requires tact and patience, otherwise he may become sullen and his senses blunted. The horse with a treacherous temper is very resentful. He acts without apparent cause and when least expected. He may balk, fight or run away. The other classes when once conquered remain obedient, but not so with the treacherous horse. Perfect score for draft, three points; for driving, four points.

DETAIL CHARACTERS OF THE HORSE

After considering the general appearance pass to the detail examination carefully noting each character, taking them in a regular order, that none may escape examination.

Head and neck.—The head should be lean, with broad forehead, tapering toward the nostrils, and the features of the face distinct. In the draft horse the head will be larger, fuller, and coarser proportionately than in the driving horse. The muzzle should be fine; nostrils large, open and of pink color; lips thin; and teeth sound. The eyes should be large, full, clear and bright, indicative of a kind disposition and good health. The ears should be active, refined, directed forward and wide apart.

The neck of the draft horse should be short, massive, well arched and carried horizontally. A nicely arched and well-muscled neck of sufficient length, carrying the head gracefully, is a very desirable feature of the light horse. The windpipe should be large and the outline appear distinct from the rest of the neck. The head and neck, as well as the neck and body, should blend smoothly at the

attachments. Perfect score for draft, five points; for driving, five points.

Forequarters.—To give elasticity to the movement and to permit of clean action the light horse's shoulders should be long and sloping well into the back, thus strengthening the back and extending the length of the underline; the arms should be short and comparatively upright, giving an upstanding appearance; the forearms should be vertical, long and well muscled. The muscles should be well developed and stand out distinctly just below the junction of the leg and body and taper gracefully downward. The knees should be clean cut, wide and deep. They should be much broader in front than the leg, either above or below. The cannons should be short, deep, clean, and the tendons well detached; the fetlocks should be wide, deep and free from puffiness; and the pasterns should be clean, strong and sloping. The feet should be round, dense, fine in texture and sound. The sole should be concave; the bars strong and the frog large and elastic and bear the mark of natural usage as a buffer. Perfect score for driving, 19 points.

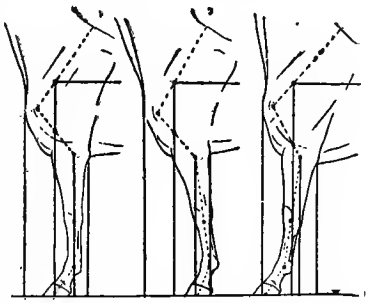


FIG. 12.—POSITION OF FRONT LEGS

1. Correct position; 2, standing under; 3. standing forward.

Among draft horses, the shoulders should be smooth, heavily muscled and moderately sloping into the back. A slope of about 45 degrees is proper. The arms should be short, heavily muscled and extending well to the rear, thus giving the horse a low-set appearance; the forearms should be large, wide and heavily muscled. The knees should be broad, deep and well defined, though

they may not be as clean cut as among lighter horses. The cannons should be short, deep and clean, with the tendons well detached; the pasterns should be clean cut, sloping, and of medium length. The feet, though often inclined to be large, should be round, dense, fine in structure, of equal size, and perfectly sound. Dark-colored hoofs are preferred, and they should have an oily coat of natural wax. The sole, bars and frog should be much as suggested above. Perfect score for draft, 20 points.

Body.—In the light horse the chest should obtain its capacity more from depth than width. A deep chest permits a freer play of the shoulders and indicates staying power. The breast should be carried forward with much prominence. The withers should be clearly defined. The ribs should be well sprung and of good length, as a well-sprung rib gives lung capacity and a long rib gives digestive capacity. The back should be short, strong and well muscled; the loin should be short and strongly joined; and the underline should be long. This combination favors action and speed. Perfect score for driving, eight points.

In the draft horse, the chest should be deep, wide and full, with the breast broad and muscular. The front ribs should be well sprung and long, giving the horse a broad back and deep chest. The back and loin should be short and heavily muscled; the coupling should be close and strong; the ribs roundly arched; the flanks low, giving a deep, strong body with an abundance of room for the respiratory and digestive organs. This conformation favors draft and endurance. Perfect score for draft, 10 points.

Hindquarters.—In the driving horse the hips should be wide in proportion to the other parts, and prominent. The croup should be long, muscular and comparatively straight. This allows greater play of the main muscles, which is favorable to the production of speed. The tail should be long, full, fine and carried high. The thighs

should be upright, well muscled and deep; the buttocks firmly muscled and well descended; and the gaskins or hind legs, from the thighs to the hocks, should be long and well muscled.

The hocks should be large, deep, clean cut and properly set. The bone forming the point of the hock should be prominent, since this gives a better attachment for the tendons which pass over it, thereby giving the hind leg a deeper appearance and increasing its efficiency. The cannons should be short, deep, clean, with tendons well detached and parallel to the cannon bones; the fetlocks should be wide, deep and clean; and the pasterns rather long, sloping and strong. The hind feet should be oval, dense, fine in texture, of good size and perfectly sound. Perfect score for driving, 25 points.

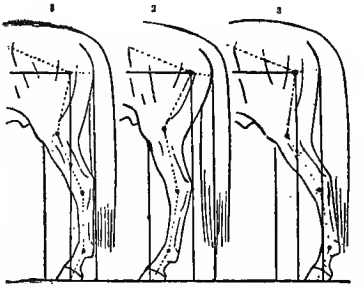


FIG. 13.—POSITION OF HIND LEGS

1. Correct position; 2. standing under; 3. standing forward.

In the draft horse, the hips should be level, wide and smooth. The croup should be broad, thickly muscled and moderately sloping, though there is considerable difference in draft horses in this regard. The thighs and buttocks should be heavily muscled. The direction of the thigh and hind leg should be such as will give the muscles the most favorable attachment for the development of power. This means, perhaps, that the lower part of the thigh should be inclined well forward and that the leg should be moderately sloping from the thigh to the hock. The hock should be wide, deep, properly set and clearly defined; the cannons should be short and clean with tendons well detached; the fetlocks should be wide, deep and

clean; and the pasterns clean cut and of medium length. The foot, though inclined to be large, should be oval, dense, fine in texture and sound. Perfect score for draft, 30 points.

COMPARATIVE JUDGING

In comparative judging, instead of comparing the horse with a standard of perfection, we compare two or more animals. To do this carefully examine and compare the relative size, height, weight and the like; also the detail characters of the horses in a class, to be placed in the order of their merit. Make examination for soundness when comparing quality. While the horses are being moved to compare their action, note their temperament and style.

The horse which is superior in the greatest number of these considerations and without notable fault will be of the greatest service and will sell for the highest price on the market; therefore, is the most desirable and should be placed first. Continue until each horse has been placed according to his merit.

Examine the horse in his stall.—When purchasing a horse, if possible, he should be examined in his stall. Note the manner in which he is tied to the manger; whether he has been chewing the tie-strap or the fixtures; how he stands in the stall, and his general behavior when one steps to his side. Note the animal's behavior while grooming, particularly along the abdomen, the back of the forelegs and the front of the hind legs, as well as the flanks. Harness him. Note the manner of taking the bit; the general conduct when placing the head stall over the ears; the harness over the back; the crupper under the tail; and when buckling the girth.

The horse may now be taken from his stall. Note the action as he is being turned around. In a few sale stables there is a contemptible practice of introducing ginger into

the rectum as the horse is being taken out, as this serves to stimulate him and he shows to advantage. As the horse passes out of the stable, the doorway affords a good place to examine the eyes, nostrils, mouth, and to note the age.

Examine the horse in harness.—Lead the horse to halter, observing the action and temperament, first at the walk and then at the trot. These observations should be made from the front, from behind and from either side. Now attach the horse to a vehicle and observe the action and temperament at both the walk and trot as before. Do not neglect the walk, as this is a very important gait. Note the manner of starting, stopping, turning to the right and left, backing and the like. Drive the horse rapidly a short distance, stopping him quickly and observe the ease and regularity of breathing and his manner of standing (p. 49).

CHAPTER III

PROPORTIONS AND MECHANICS OF THE HORSE

By proportions of the horse are meant the correlation and the agreement of the various parts with each other and with the body as a whole. The parts of the horse when studied in the light of proportions show us relations of length, width, thickness, direction, development and the like. This detailed study of the relationship of the various parts is very efficient in developing the "eye" and the judgment.

The proportions of the horse are considered from two points of view. First, the relations existing between the length, width and thickness of the various parts of the horse; and second, the relations of the directions possessed by the bones superposed one upon the other, thus forming angles. These relations tend to make the legs long or short and have an influence upon the production of speed or power.

Dimensions of the parts.—To study the relation existing between the various parts of the horse, we must first obtain the dimensions of the parts. The lengths, widths, thicknesses, and the like, are taken with a measuring staff of parallel bars, the circumference with a tape and the angles and inclinations with a compass and plumb line, although for accurate results in measuring the angles an arthrogoniometer should be used. This is an instrument somewhat similar to a compass. The following list includes the more important parts useful in a study of the proportions of the horse:

STUDENT'S CARD FOR THE PROPORTIONS OF THE HORSE.

	Inches	Inches
Height at withers		
Height to highest point of croup		
Height of crest of head from ground		
Length from point of shoulder to quarter		
From lowest point of chest to the ground		
From the point of elbow to the ground		
From the point of elbow to knee		
From knee to ground		
Circumference of the arm		
Circumference of cannon in center		
Circumference of foot at coronet		
Length of head		
Width of forehead		
From angle of lower jaw to forehead above eye		
From throat to superior border of neck		
Circumference of muzzle at angle of mouth		
Width of chest from outside of shoulder points		
Top of shoulder to hip		
Width across hips		
Length of croup		
From center of dock to point of stifle		
From point of hock to point of hip		
From point of hock to ground		
Circumference of thigh		
Circumference of shank in the center		
Circumference of body at the girth		

Measurements of horse.—Accurate measurements are extremely difficult to obtain: First, because the horse is continually shifting his position, which alters the meas-

urement; and, second, because some of the parts are not well defined and it is often difficult to know just where to begin the measurement. Where reliable information

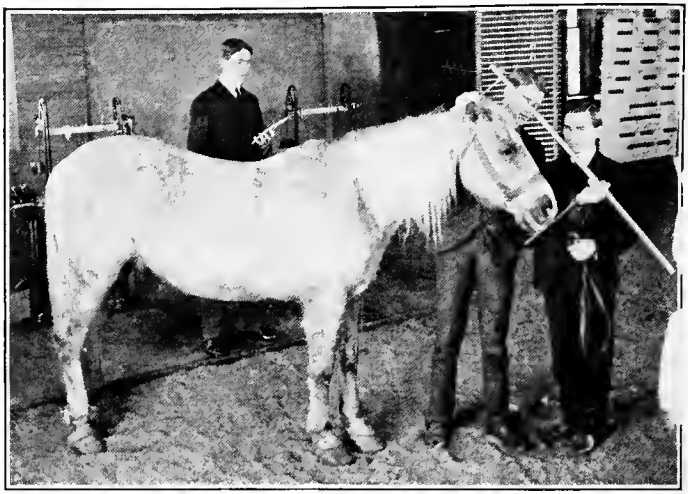


FIG. 14.—MEASURING THE HEAD

is desired, the measurements should be carefully checked. The following table gives an idea of the measurements of some of the more important parts in both heavy and light horses:

MEASUREMENTS FOR DRAFT AND SPEED HORSES

Name of part	Draft	Speed
Number of horses measured	55.0	32.0
Weight, pounds	1,613.0	....
Height at withers, inches	66.0	61.7
Height at highest point of croup	65.6	61.6
Length from point of shoulder to quarter	67.8	62.8
From lowest point of chest to ground	33.5	34.0
Length of shoulder	27.25	23.9
Length from top of shoulder to hip	30.4	28.5
Circumference of body at girth	90.0	70.0
Length of head	26.6	24.6

The unit of proportions.—In a study of the proportions of the horse, the length of the head is taken as the unit. This is because the head varies less, perhaps, than any other part and its length is easily obtained, as the boundaries are clearly defined. It is interesting to note that the total height of the horse from the crest of head to the ground is equal to about three head lengths; that the height from the withers and from the croup to the ground,

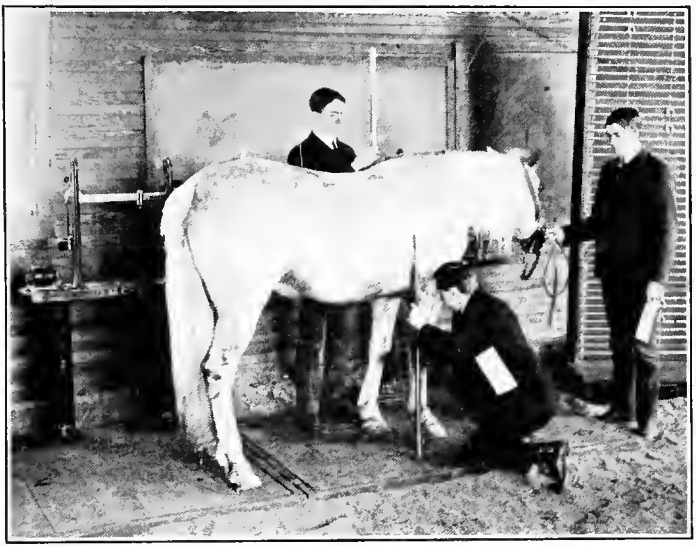


FIG. 15.—A STUDY IN PROPORTIONS

as well as the total length of the horse from the point of the shoulders to the buttocks, is about 2½ head lengths; and that the length of the neck from poll to withers, the length of the shoulder from the withers to the point at the elbow, the thickness of the body from side to side, and the depth of the body from back to the abdomen, is equal to about one head length.

Dimensions of articular angles.—Besides the relations

of length, width and thickness which exists between the different parts of the body, it is also important to know the relations of directions possessed by the different bony regions, superposed one upon the other, to form the fore and hindquarters. From the manner in which the bones are arranged angles are produced. The inclination of the bones and the dimensions of the angles have an influence upon the draft and speed. Such measurements as these, however, are exceedingly difficult to obtain, as the bones are so deeply imbedded in muscle that their direction cannot be located with exactness. The following table includes the more important parts useful in a study of the proportions of the horse.

STUDENT'S CARD FOR THE ARTICULAR ANGLES OF THE HORSE.

INCLINATION UPON THE HORIZON	Degrees	Degrees
Scapular*		
Humeral		
Iliac		
Femoral		
Tibial		
ARTICULAR ANGLES IN STATION		
Scapular-humeral		
Humero-radial		
Metacarpo-phalangal		
Ilio-femoral		
Femoro-tibial		
Tibio-metatarsal		
Metatarso-phalangal		
ATTITUDES IN STATION		
Anterior members viewed in profile		
Anterior members viewed in front		
Posterior members viewed in profile		
Posterior members viewed from behind		

*For location of parts see page 35.

Measuring the angles.—If an arthrogoniometer, useful for measuring articular angles, is not available, the inclination of the members and the value of the angles may be obtained by sticking wafers over the joints, on the withers, hips and hoofs, which serve as marks to indicate the direction of the members. Place the horse in a good position and photograph him. Upon the photographic

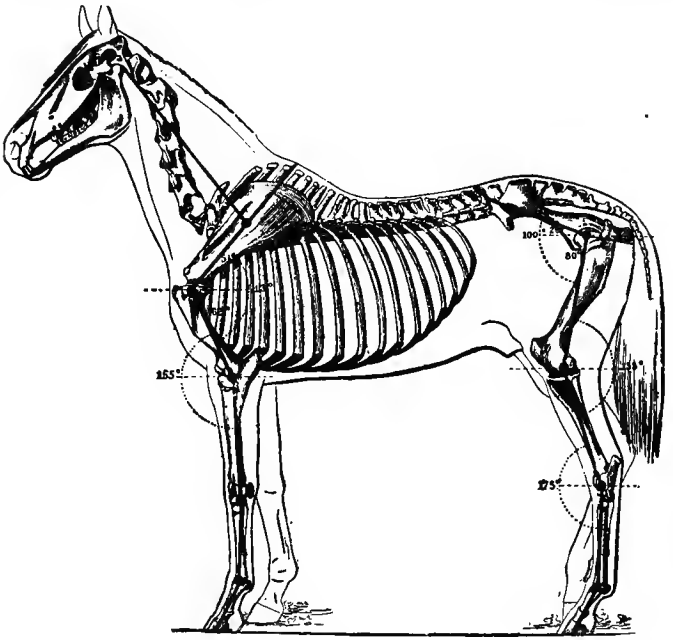


FIG. 16.—A STUDY IN ARTICULAR ANGLES

print thus obtained the wafers serve as landmarks which may be joined by straight lines to obtain the real directions of the members. It only remains now to estimate with a protractor the inclination of each line as well as the value of the angles which are formed by the lines.

INCLINATION OF THE PARTS UPON THE HORIZON AND VALUE OF THE ARTICULAR ANGLES IN FAST HORSES*

Name of part	Inclination		Value of angle Contained
	Of the superior sigment	Of the inferior sigment	
Forequarters	Degrees	Degrees	Degrees
Scapulo-humeral†	55	60	115
Humero-radial	50 to 55	90	140 to 145
Metacarpo-phalangal	90	60	150
Hindquarters			
Coxo-femoral	30 to 35	80	110 to 115
Femoro-tibial	80	65 to 70	145 to 150
Tibio-tarsal	65 to 70	90	155 to 160
Metatarso-phalangal	90	65	155

* The Exterior of the Horse, Goubaux and Barrier, page 377.
† For location of the parts see page 35.

Mechanics of the horse.—A study of the mechanics of the horse enables us to compare the horse with a machine. A machine may be defined as a combination of one or more of the six mechanical powers—lever, wheel and axle, pulley, inclined plane, wedge and screw—arranged in such a manner as to transmit power in a desired direction. In a somewhat similar manner the bones and muscles of the horse are combined in such a way as to constitute a prime mover, also capable of transmitting power in a desired direction. In the horse as in the machine power is gained at the expense of speed, and speed is gained at the expense of power.

In the draft horse power is obtained in two ways: By the weight of the animal and by propulsion through the hind legs, body and shoulders. In the light horse speed is obtained in three ways: By the long reach of the legs, by propulsion and by leaping. In the light horse the muscles have a tendency to parallel the bones, thus giving

a slender form; whereas in the draft horse the muscles work more at right angles to the bones, thus favoring power and giving a massive appearance. It can be stated

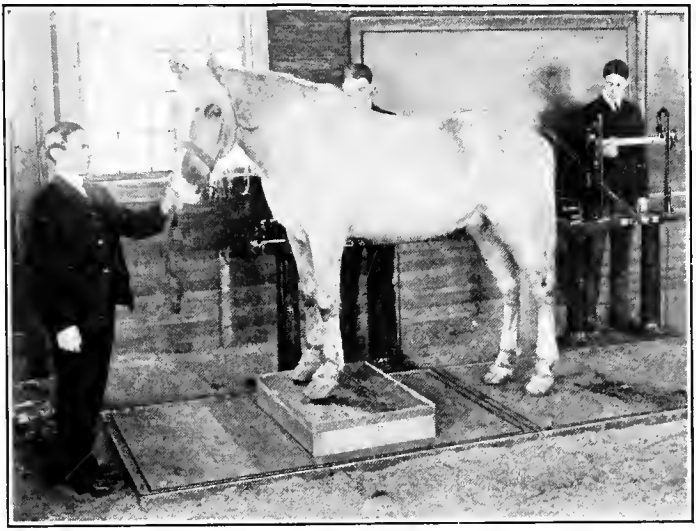


FIG. 17.—A STUDY IN MECHANICS OF THE HORSE

as a general law that in animals of speed the muscles are long and slender and have a tendency to parallel the bones; while in animals of power the muscles are short and thick and have a tendency to work at right angles to the bones.

CHAPTER IV

ANATOMY, UNSOUNDNESS, AND AGE OF A HORSE

In order to be a successful judge of horses it is important to be able to recognize the slightest unsoundness, as well as to tell the age of a horse. Since unsoundness often has its origin in the bones, muscles, tendons and ligaments, as well as in the respiratory and digestive systems, we should have a general knowledge of the anatomy of the horse.

ANATOMY OF A HORSE

In this brief review of the anatomy we will consider the bones, cartilages, muscles, tendons, ligaments and connective tissues as well as the circulatory apparatus, respiratory apparatus, digestive apparatus and nervous system.

Bones.—The framework of the horse's body consists of the skeleton, which is composed of a large number of connected bones moved by muscles. The bones that enter into the formation of the skeleton are of various forms and sizes according to the use for which they are destined. They are divided into three classes: Long, flat and irregular.

Long bones, which are composed of a hollow shaft and two extremities, are situated in the legs. Flat bones, which are composed of two layers of compact bone with one of cancellated tissue intervening, form cavities; and, irregular bones, which consist chiefly of cancellated tissue covered by a thin, compact layer, enter into formation of joints. Good examples of long bones are the humerus and radius; of flat bones are the scapula, ilium and

ischium; and good examples of irregular bones are those of the knee—scaphoid, lunar and the like. (Fig. 18.)

Cartilage.—This is a strong, flexible, bluish-white substance, which is found in connection with bone and of

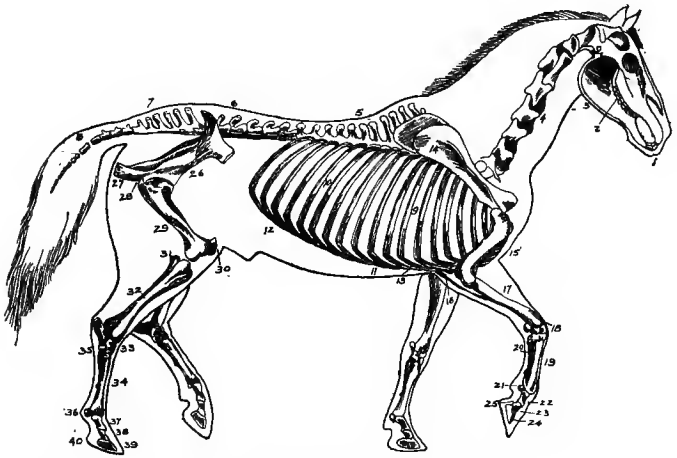


FIG. 18.—SKELETON OF THE HORSE

1. Incisor teeth
2. Molar teeth
3. Lower jaw
4. Cervical vertebra
5. Dorsal vertebra
6. Lumbar vertebra
7. Sacral vertebra
8. Caudal vertebra
9. Sternal ribs
10. Asternal riba
11. Sternal cartilages
12. Asternal cartilages
13. Sternum
14. Scapula
15. Humerus
16. Ulna
17. Radius
18. Carpus, 7 bones
19. large metacarpus
20. Small metacarpus
21. Sesmoids
22. Os suffraginis
23. Os coronae
24. Os pedis
25. Navicular
26. Ilium
27. Ischium
28. Pubis
29. Femur
30. Patella
31. Fibula
32. Tibia
33. Tarsus, 6 bones
34. Large metatarsus
35. Small metatarsus
36. Sesmoids
37. Os suffraginis
38. Os coronea
39. Os pedis
40. Navicular

which there are various kinds such as articular, temporary, prolongation and the like. Articular cartilage covers the ends of bones that form movable joints; temporary cartilage is bone in transition form; and prolongation cartilage forms an elastic continuation of the top of the shoulder blade.

Muscles.—The horse's moving power is derived from muscles, which form the lean meat and which, as a rule, are indirectly attached to bones. Muscles act by virtue of the property they possess of being able to shorten themselves on being stimulated by the nervous system.

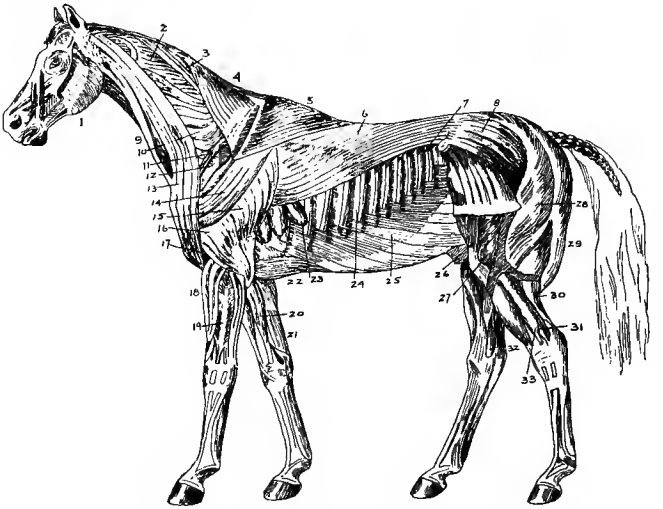


FIG. 19.—MUSCLES OF THE HORSE

1. Masseter
2. Splenius
3. Levator humeri
4. Cervical trapezius
5. Dorsal trapezius
6. Latissimus dorsi
7. Serratus parvus
8. Glutens medius
9. Sterno maxillaris
10. Rhomboideus anterior
11. Pectoralis parvus
12. Antea spinatus
13. Levator humeri
14. Postea spinatus
15. Triceps extensor brachii
16. Triceps extensor
17. Flexor brachii
18. Extensor metacarpi magnus
19. Extensor pedis
20. Extensor suffraginis
21. Flexor metacarpi
22. Pectoralis magnus
23. Serratus magnus
24. Intercostal muscles
25. Obliquus abdominis
26. Rectus femoris
27. Vastus externus
28. Gluteus externus
29. Semitendinosus
30. Glastrocnemii
31. Flexor phalanges
32. Extensor phalanges
33. Extensors lateral

They are composed of contractile fibers, and their strength, other things being equal, is proportionate to their thickness. (Fig. 19.)

Tendons.—These are hard, fibrous cords of great toughness. In order to economize space, muscles are generally

attached to bones by tendons. In such cases, the tendons, at one extremity, are united to the end of the muscles, and at the other to the bones. It is difficult to tell how the muscle and tendon are joined, or by what means the union is brought about, for the parts become insensibly blended.

Ligaments.—These are fibrous structures arranged in flat bands or bundles and sometimes in membranous form. They are composed of white fibrous or yellow elastic tissue, the former has a bluish-white, silvery appearance, the latter a yellow color and is very elastic. Ligaments bind the ends of bones together and thus form strong bonds of union at the joints.

Connective tissue.—This consists of strong, fibrous layers and bands which furnishes a supporting network for the muscles, skin and other tissues. Connective tissue has only the passive action of support, and the more of it a muscle contains the coarser and less powerful it will be; though it will be better able to resist the effects of external violence than one of finer grain. The connective tissue, also, forms ligaments, tendons, surrounds bones, cartilages, nerves and the like. Where the tissue is present in large amounts the underlying parts will be ill-defined. This is especially noticeable about the tendons and ligaments below the knees and hocks, owing to the absence of muscle about these parts.

The thickness of the skin is a measure of the amount of connective tissue contained in the muscle, and as the action of this tissue is only passive, the more of it a muscle contains, the slower will be the movements. Hence the horse having a thick skin and ill-defined tendons would warrant us in supposing that he was deficient in quality.

Circulatory system.—This consists of the heart, arteries, capillaries and veins. The heart is the central organ of the system and is divided into four chambers—the right and left auricle and the right and left ventricle. The action and the function of the blood will be best

understood by following its course. The left auricle receives the pure blood from the lungs and delivers it to the left ventricle, then through the arteries, to the capillaries in all parts of the body, where it is relieved of oxygen and other constituents necessary to the life of the tissue

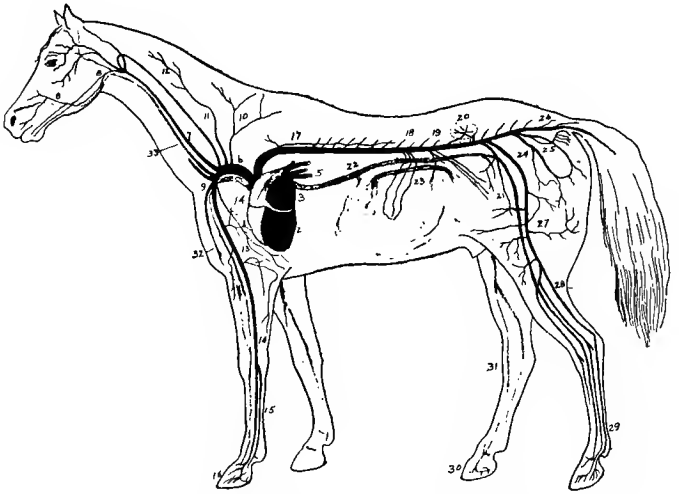


FIG. 20.—CIRCULATORY SYSTEM

1. Heart, right ventricle
2. Heart, left ventricle
3. Heart, left auricle
4. Pulmonary artery.
5. Pulmonary veins
6. Anterior aorta
7. Carotid artery
8. Maxillary artery
9. Left axillary artery
10. Dorsal axillary artery
11. Cervical artery
12. Vertebral artery
13. Humeral artery
14. Radial artery
15. Metacarpal artery
16. Coronary artery
17. Posterior aorta
18. Cœliac artery
19. Mesenteric vessels
20. Renal artery
21. Spermatic artery
22. Posterior vena cava
23. Vena portae
24. External iliac artery
25. Internal iliac artery
26. Lateral sacral artery
27. Femoral artery
28. Posterior tibial artery
29. Metatarsal artery
30. Venous network of foot
31. Internal sophenal vein
32. Brachial vein
33. Jugular vein

and is loaded with waste matters. It is then returned to the right auricle and delivered to the right ventricle, then through its branches to the lungs, where it gives up the waste materials and receives a fresh supply of oxygen. (Fig. 20.)

Respiratory system.—This consists of the nostrils, pharynx, larynx, trachial tubes and lungs. The lungs are the central organs and are two in number. They consist of a great number of small sacs, which are collected into lobes of various sizes, each of which is connected with the

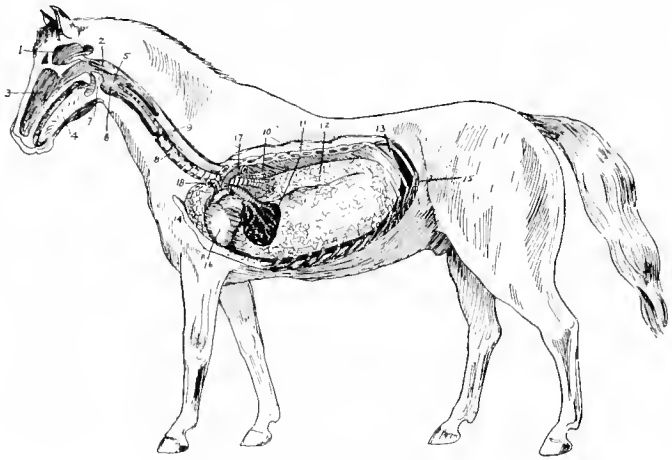


FIG. 21.—RESPIRATORY SYSTEM

1. Cranial cavity
2. Guttural pouch
3. Nasal cavity
4. Tongue
5. Pharyngeal cavity
6. Cavity of larynx
7. Epiglottis
8. Trachea
9. Œsophagus
10. Left bronchus
11. Right bronchus
12. Right lung
13. Left lung
14. Sternum
15. Ribs
16. Heart
17. Posterior aorta
18. Anterior aorta

branches of the bronchial tubes. It is by means of these lobes and sacs that the lungs relieve the blood of its waste materials and invest it with a fresh supply of oxygen during respiration. (Fig. 21.)

Digestive system.—This apparatus consists of a series of organs which receive and digest the food. These organs are the mouth, pharynx, œsophagus, stomach and intestines. The stomach of the horse is a single organ and is much smaller than the stomach of the cow, having

a capacity of about 19 quarts.* The intestines consist of two parts of unequal size. The smaller, which is about 74 feet in length, has a capacity of approximately 70 quarts, and is called the small intestine. The larger, which is about 24 feet in length, has a capacity of ap-

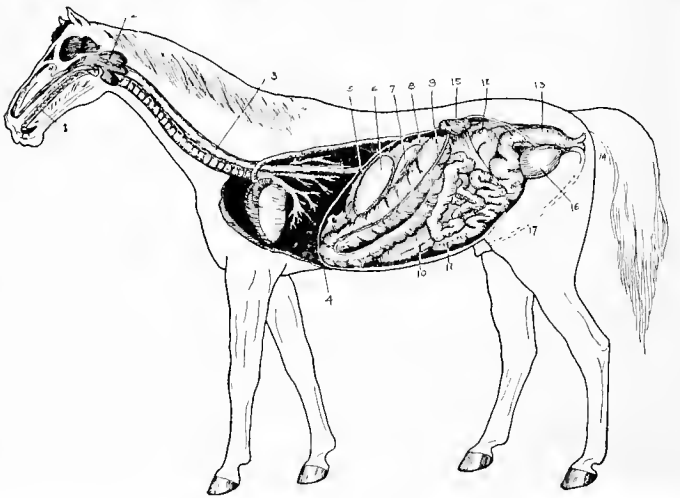


FIG. 22.—DIGESTIVE SYSTEM

1. Mouth
2. Pharynx
3. Oesoohagus
4. Diaphram
5. Spleen
6. Stomach
7. Duodenum
8. Liver.
9. Large colon
10. Cæcum
11. Small intestines
12. Floating colon
13. Rectum
14. Anus
15. Left kidney
16. Bladder
17. Urethra

proximately 140 quarts, and is called the large intestine. It is divided into three parts, the cæcum, colon and rectum. (Fig. 22.)

While the capacity of the horse's stomach is less than that of the cow, that of the large intestine is much greater due largely to the cæcum—a greatly enlarged portion of the alimentary tract, linking the small and large intes-

*Feeds and Feeding, W. A. Henry, page 19.

tines. Into the cæcum is passed much of the undigested matter, together with the digestive agencies of the small intestine. Here the digestive processes are prolonged, thus compensating, in part at least, for the small capacity of the horse's stomach.

CAPACITY AND LENGTH OF THE HORSE'S STOMACH AND INTESTINES, COMPARED WITH THAT OF THE COW, SHEEP AND HOG.

Animal	Capacity, quarts				Length, feet		
	Stomach	Small intestine	Large intestine	Total	Small intestine	Large intestine	Total
Horse.....	19.0	67.4	137.4	223.8	73.6	24.5	98.1
Cow.....	266.9	69.7	40.1	376.7	150.9	36.3	187.2
Sheep.....	31.3	9.5	5.9	46.7	85.9	21.4	107.3
Hog.....	8.5	9.7	10.8	29.0	60.0	17.1	77.1

Nervous system.—This system consists of the brain, spinal and sympathetic ganglia, and nerves. The different organs of this system are composed of two structures, the vesicular or gray matter and the fibrous or white matter. The nervous substance presents two distinct forms—nerve cells and nerve fibers. The nerves arise from the cerebro-spinal axis and, branching as they go, are distributed to all parts of the body. Every organ and tissue has its supply of nerves connecting it with the brain or spinal cord. (Fig. 23.)

The nervous system of the horse is the power which stimulates and directs the action of his muscles, and is the source of his mental capacity. In general, the amount of contraction force exhibited by a muscle is proportionate to the degree of stimulation given by its nerves. In considering the form of the horse from a mechanical point of view, we must not lose sight of the marked difference which exists in the nervous system of various animals.

Thus the horse possessing a very energetic nervous adaptation may be a very superior animal even though his conformation may not be all that is desired; or the

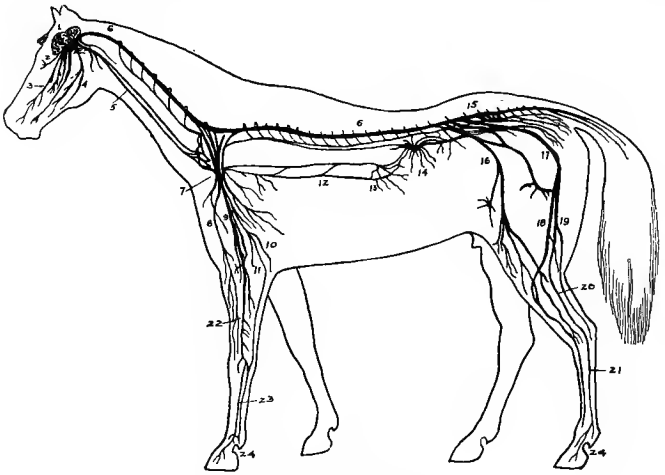


FIG. 23.—NERVOUS SYSTEM

1. Brain
2. Optic nerve
3. Superior maxillary nerve
4. Inferior maxillary nerve
5. Pneumogastric nerve, front
6. Spinal cord
7. Brachial plexus
8. Prehumeral nerve
9. Anterior brachial
10. Radial nerve
11. Cubital nerve
12. Pneumogastric nerve
13. Gastric solar plexus
14. Solar plexus, center
15. Sacro lumbar plexus
16. Anterior femoral and saphena nerves
17. Sciatic trunk
18. Small femoral popliteal nerve
19. Great femoral-popliteal nerve
20. Posterior internal tibial nerve
21. Posterior plantar nerve
22. Internal radial nerve
23. Anterior plantar nerve
24. Plantar nerve

horse of excellent form may be rather inferior because of the lack of nervous application.

COMMON UNSOUNDNESS AND FAULTS

The imperfections of the horse may be divided into two general classes—unsoundness and faults. A satisfactory definition of either an unsoundness or a fault is not easily

given. The term "unsound," as used by horse dealers, is often loosely applied. It may mean anything from a slight injury to a defect so serious as to render the horse worthless. The best usage warrants dividing these imperfections into two classes—blemishes and unsoundness. Likewise the term "fault" is applied to a variety of conditions. It may signify anything from a mere bad habit to a vice that renders the animal worthless. Usage warrants dividing these imperfections into two classes—whims and vice.

A blemish.—This may be defined as an imperfection that depreciates the value of a horse without interfering with his usefulness—as a wire cut, car bruise, and the like—which mar the appearance of the horse but do not limit his functions.

An unsoundness.—This may be defined as an imperfection of so serious a nature as to interfere with the usefulness of the horse, as ringbone, sidebone, splints and the like.

A whim.—This may be defined as a minor moral imperfection, as tongue lolling, tossing the head, tearing blankets, pawing, and the like.

A vice.—This may be defined as a more serious moral imperfection, as balking, kicking, running away, and the like.

Locating unsoundness.—The ability to locate unsoundness depends largely on practice; although some imperfections, principally the faults, cannot be detected by an ordinary examination, and it is only after becoming familiar with the horse that these will be observed. Hence, to detect faults the reader is referred to Chapter 37, Whims and Vices of the Horse (p. 385). In locating unsoundness it is well to follow a regular order beginning with the head.

Poll evil.—This is an enlargement of the poll at the top of the head, containing or discharging pus. It is a serious

unsoundness and difficult to cure. Look for scars. (Fig. 24.)

Impaired vision.—A horse by his action will usually betray imperfect eyesight. The ears are exceedingly active, as if trying to aid the eyes. The pupils should contract in the light. This indicates that the eye is sensitive and functional. Cloudiness or opacity denote "moon-blindness"—periodic ophthalmia.

FIG. 24.—POLL EVIL

Defective hearing.—Lack of mobility in the ears and active eyes denote deafness. The horse is unresponsive when commanded.

Discharge from the nostrils.—The lining membrane of the nostrils should be healthy, pink in color and free from ulcers, or purple spots. A profuse, foul-smelling and colored discharge suggests glanders, catarrh, distemper, and the like.

FIG. 25.—FISTULA WITHERS

Irregular, decayed and broken teeth.—Examine for diseased, missing or projecting molars; broken or overlapping incisors; "bishoping" (p. 55), and under-shot jaws. Broken incisors suggest cribbing. A foul odor indicates unsound teeth.

Broken crest.—The top of the neck should be examined

for broken crest, particularly in stallions, and for "braided in" mane, as well as sores and skin disease.

Fistula.—Exceeding tenderness at the withers may indicate that the horse has fistulas, though at the time there may be no external signs. (Fig. 25.)

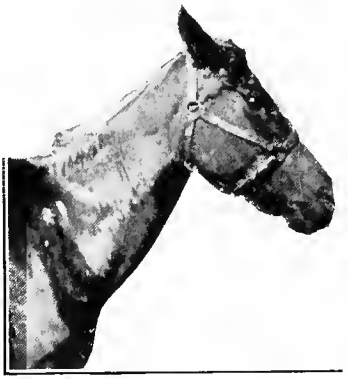


FIG. 26.—COLLAR BOIL

Fibroid tumors.—These occur at the top of the withers and appear as hard calluses.

Sweenied shoulder. — This is a wasting away of the muscles on the outside of the shoulder blade. It can be readily detected, as the shoulder appears flat and the blade bare of muscle.

Collar boils.—Examine the shoulders closely for collar boils, galls, and the like. (Fig. 26.)

FIG. 27.—BUCK KNEES

Capped elbow.—This consists of a tumor or boil on the elbow joint produced by the shoe while the horse is lying down. Such sores are often called "shoe boils."

Unsound knee.—The knee should be examined for bony enlargements, puffs, scars, high splints, capped knee, "buck knee"—bent forward—"calf knee"—bent backward—and the like. Scars on the front indicate that the horse stumbles. (Fig. 27.)

Splints.—These are abnormal bony growths formed at the sides of the cannon bones. When located on the back part of the leg, near the tendon, or close to the knee or fetlock joint, they are considered most objectionable, as they are likely to

cause lameness. Splints may disappear from young draft horses.

Unsound fetlocks.—Examine these joints for puffs—wind galls—"interfering" sores, "knuckling" or "cocked" ankles, grease heel and scratches. It is on or near these joints that horses are occasionally "unnerved"—cutting the nerves to prevent lameness. Scars suggest this.

FIG. 28.—SIDEBONE AND CRACKED HOOFS

Sidebones.—These are bony growths located under the skin of the coronet, at the quarters. They are due to the lateral cartilages at these parts changing to bone. Sidebones are common in draft horses having wide, flat, low-heeled hoofs. (Fig. 28.)

Ringbones.—These are bony bunches located on the pasterns. There are two forms, called high or low, depending on the location. (Fig. 29.)

FIG. 29.—RINGBONE

Scratches.—These painful sores are located at the bottom of the cannons, at the fetlocks and on the pasterns.

Quittor.—This is a fistulous abscess or running sore occurring at the top of the hoof or coronet, sometimes called "gravel."

Cracked hoofs.—Closely examine the hoofs for quarter cracks—cracks extending from the coronary band downward; for sand cracks—cracks extending from the bottom

upward; and for toe cracks—cracks at the toe. (Fig. 28.)

Seedy toe.—This is a diseased condition of the wall of the hoof at the toe, usually caused by bad shoeing.

Navicular disease.—This is due to overworking the tendons that pass to the navicular bone, and is rather common in light and very active horses. It is indicated by a contracted hoof. The affected horse usually points his lame foot forward when standing. It is a cause of chronic lameness.

FIG. 30.—WEAK AND SICKLE-SHAPED HOCKS

Laminitis, or "founder."—This is due to a congestion of the blood in the region of the toe, and is rather common in heavy horses. It is indicated by rings and ridges on the hoof wall, abnormal projections at the toe, convexity at the sole and lameness.

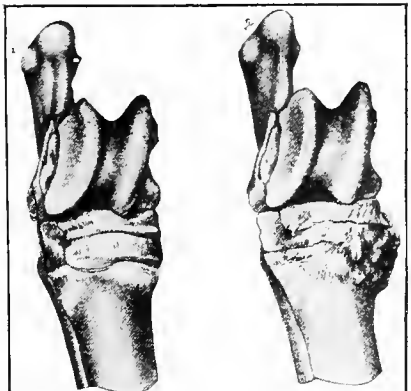


FIG. 31.—SOUND AND UNSOUND HOCKS
1. Sound hock; 2. Unsound hock.

Bunions or "corns."—These are located in the corner of the heels and are rather common in horses with low, weak heels.

Thrush.—This is a diseased condition of the foot in the region of the frog, characterized by a foul-smelling discharge from its cleft.

Fractured hips.—Examine the hips for fractures. Com-

pare one hip with the other from the rear. Note the haunches at the side of the tail for similar distortion.

FIG. 32.—SOUND HOCK, SHOWING TENDONS

Sore tail.—The black skin of the under side of the tail and nearby parts is often the seat of cancerous or pigment tumors in white or gray horses. Note the tail to see that it is not artificial.

Thoroughpin.—This consists of an enlargement in the "hollows" between the tendon and the upper part of the hock. It may be easily detected, as it may be pushed from side to side.

Spavin.—There are four kinds of spavin—bone, bog, occult and blood. Bone spavin consists of a bony growth on the inside and front of the hind leg just below the hock. Bog spavin occurs in the natural depression on the inner and front part of the hock, and consists of a soft swelling. Occult spavin is located in the hock joint. The term "blood spavin" is sometimes applied to the enlargement of the vein that passes across the front of the hock.

FIG. 33.—COCKED ANKLE

Jard.—This is a bony growth appearing on the outer side of the hock joint.

Curb.—This occurs on the back of the cannon between the hock and the fetlock, usually just below the hock.

Stringhalt.—This consists of a marked jerking of the hind leg as the horse travels, noticeable when the animal starts.

Forging and overreaching.—When the shoes of the hind feet strike those of the fore feet, the horse is said to forge. Overreaching is the striking of the fore and hind feet in such a way as to injure the horse.

Interfering.—When the horse strikes his fore or hind feet in such a way as to injure himself he is said to interfere.

Locating lameness.—When standing, a horse troubled with a sore foot will extend it forward. When the lameness is in the shoulder, the leg will be flexed at the knee. When in motion, the horse puts down the sound foot with confidence and makes an effort to ease the ailing one by throwing the head up as it strikes the ground.

Unsound wind.—There are three defects of the wind—thick wind, roaring and heaves. To detect these drive the horse rapidly a half mile, then stop and quickly note the breathing by placing the ear near the lungs, or the neck. If the horse gets his breath with difficulty, he is thick winded; if he wheezes and whistles, he is a roarer; and if the breathing is irregular, he is likely troubled with heaves.

A horse that has passed through many hands in a short period should be carefully examined, for it is likely that he possesses some whim, vice, blemish or unsoundness that is not easily discovered.

ESTIMATING THE AGE OF A HORSE

The value of a horse depends largely upon his age. Familiarity with the characters that indicate age are, therefore, often extremely useful. A knowledge of these characters is easily secured, but skill in their application depends much on continued practice.

General characters indicating age.—The teeth furnish the best index to the age of a horse, yet there are other general characters that play an important part, especially in young and old animals. In estimating the age of

young horses, size is the principal factor to be considered. In old horses the joints become angular; the poll more prominent; the sides of the face more depressed; the hollows above the eyes deeper; the backbone becomes more prominent and often strongly curved downward; and the horse does not stand squarely on his legs, which show much wear. White hairs make their appearance around the temples, the eyes, the nostrils and elsewhere.

Age by the teeth.—The order of the appearance of the teeth and their method of wearing are considered the most important and accurate means of estimating the age of the horse, and are the means employed by all horsemen. The teeth are not absolutely accurate, however, as much depends on the condition as well as the individuality of the horse. The teeth of a horse with bones of a somewhat open structure are likely to indicate that he is older than he really is; while the teeth of a horse with bones of a fine close texture may indicate him to be younger than he is. Again, the horse fed on soft and succulent food is likely to show a younger mouth, whereas one fed on hard, dry food is likely to show an older mouth.

The mature horse has 40 teeth, 20 on either jaw, divided as follows: Six incisors, two canines, one on either side, and 12 molars, six on a side. In the mare the canines are usually absent. Since the incisor teeth are noted in estimating age, they alone will be considered. It is the order in which they make their appearance that enables us to estimate the age up to five years and the manner in which their surface is worn that aids us in the estimation subsequently.

The colt.—Soon after foaling, usually within two weeks, the central pair of incisors make their appearance in both upper and lower jaw; the second or intermediate pair appear in from two to four weeks and the third pair or corners make their appearance about the fifth or sixth month of age. The difference in size of the jaw-

bone between the foal and the mature horse makes a change from milk to permanent teeth necessary.

Three years old.—At approximately two years and nine months of age the permanent pair of center incisors replace the temporary ones in both the lower and upper jaws, and by the time the horse is three years of age they are up and ready for use. They are easily recognized as they have deep hollow cups and are much longer than the temporary teeth. In the male tusks may appear at about this time. (Fig. 34.)

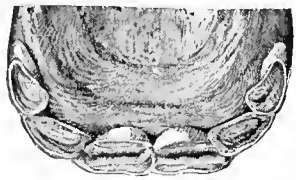


FIG. 34.—LOWER FRONT TEETH AT THREE YEARS OF AGE

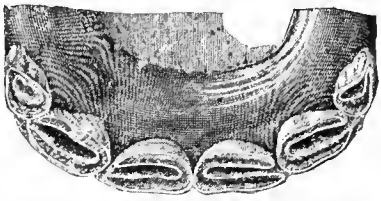


FIG. 35.—LOWER FRONT TEETH AT FOUR YEARS OF AGE

Four years old.—At approximately three years and nine months of age, the intermediate pair of permanent incisors appear in both the lower and upper jaws, and by the time the horse is four years old they are up and ready for use. The center pair show wear and the cups are about one-third gone. (Fig. 35.)

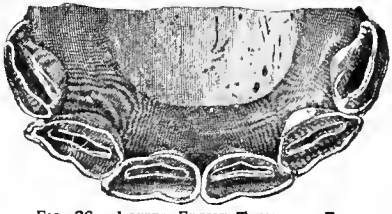


FIG. 36.—LOWER FRONT TEETH AT FIVE YEARS OF AGE

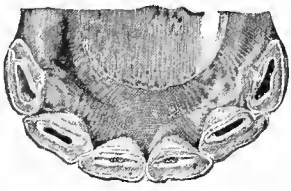


FIG. 37.—LOWER FRONT TEETH AT SIX YEARS OF AGE

Five years old.—At approximately four years and nine months, the per-

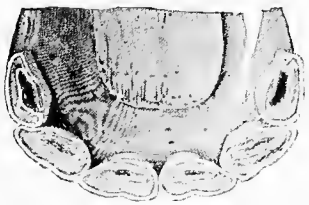


FIG. 38.—LOWER FRONT TEETH AT SEVEN YEARS OF AGE

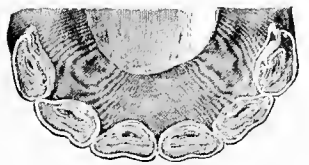


FIG. 39.—LOWER FRONT TEETH AT EIGHT YEARS OF AGE

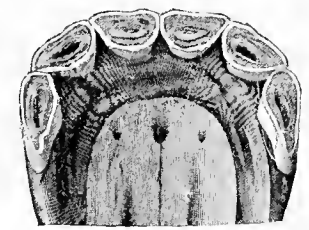


FIG. 40.—UPPER FRONT TEETH AT NINE YEARS OF AGE

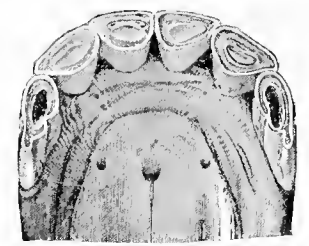


FIG. 41.—UPPER FRONT TEETH AT TEN YEARS OF AGE

manent corner incisors appear in both jaws and are up and ready for use at five years of age. At five years of age the horse has a full mouth of permanent teeth. The center incisors show much wear and have changed slightly in shape, having become rounder on the inside, the cups being about two-thirds gone. The intermediates show wear and the cups are about one-third gone. (Fig. 36.)

Six years old.—The cups in the center pair of incisors, in the lower jaw, have disappeared, or nearly so; they have become much reduced in the intermediates and show one year's wear in the corner incisors. (Fig. 37.)

Seven years old.—The cups in the intermediate pair of incisors in the lower jaw have disappeared, or nearly so; and have become very shallow in the corner teeth. There is a notch in the upper corner incisor where it overlaps the lower one. The teeth show marked changes in shape, having become thicker and rounder from the inside, and meet at a sharper angle. (Fig. 38.)

Eight years old.—The cups

in the corner pair of incisors in the lower jaw have disappeared, or nearly so; but they are present in all of the incisors of the upper jaw, though showing wear. (Fig. 39.)

Nine years old.—The cups in the center pair of incisors in the upper jaw have disappeared; though these cups are not likely to disappear at such regular intervals in the upper as in the lower jaw. Therefore, it is not always possible to tell the age of the horse so accurately. (Fig. 40.)

Ten years old.—As a rule, the cups have disappeared from the intermediate incisors in the upper jaw. The teeth are more triangular in shape, and those of the lower and upper jaw meet at a sharper angle as the age increases. (Fig. 41.)

Eleven years old.—As a rule, the cups have disappeared from the corner incisors in the upper jaw. However, because of the fact that some horses have denser bones than others, it is not uncommon to find cups in the upper teeth as late as the twelfth or the fifteenth year. (Fig. 42.)

Aged horses.—After the horse has passed the twelfth year, the matter of a year or two is unimportant. The

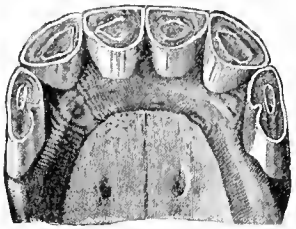


FIG. 42.—UPPER FRONT TEETH AT ELEVEN YEARS OF AGE

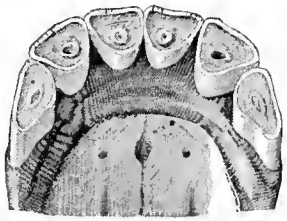


FIG. 43.—UPPER FRONT TEETH AT FIFTEEN YEARS OF AGE

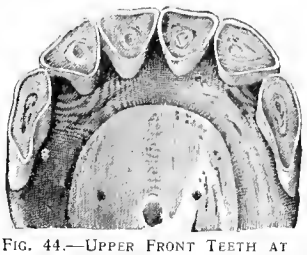


FIG. 44.—UPPER FRONT TEETH AT TWENTY-ONE YEARS OF AGE

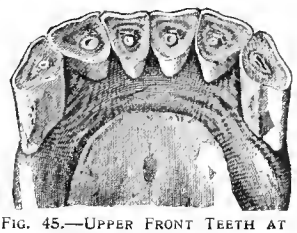


FIG. 45.—UPPER FRONT TEETH AT THIRTY YEARS OF AGE

value depends on the individuality of the horse, as some are worth more at 15 than others at 12. The general

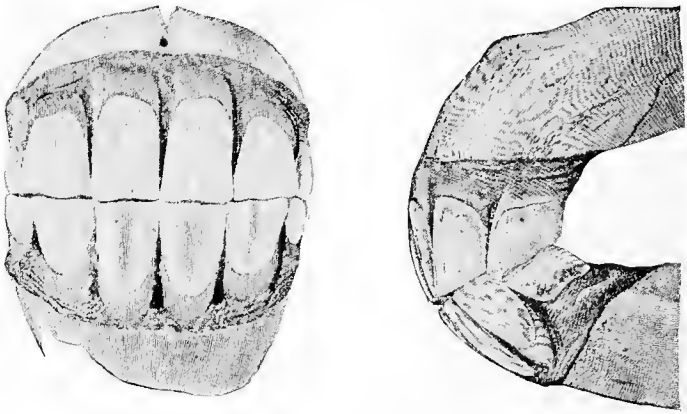


FIG. 46.—FRONT AND SIDE VIEW OF TEETH AT FIVE YEARS OF AGE

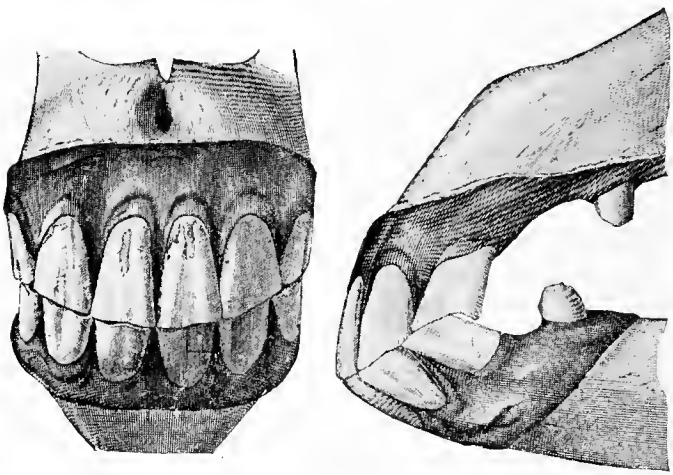


FIG. 47.—FRONT AND SIDE VIEW OF TEETH AT NINETEEN YEARS OF AGE

appearances and activities, rather than the age, determine the value.

As the age increases, the incisor teeth become more triangular, and those of the lower and upper jaws meet at a more acute angle. The tusks become large, blunt and round. The incisors may grow out so long as to prevent the molars from meeting, thus interfering with the mastication of the food. In such cases rasping the incisors until the molars meet will prove beneficial. (Figs. 45, 47.)

Irregularities in the teeth.—When the teeth are not regular the horse is said to have a "false mouth." These irregularities may occur in the number, as there may be more or less than the regular number—36 in mares or 40 in the horse; they may occur in the form of the teeth, or in the uniting of two teeth; they may occur because one jaw happens to be longer or shorter than the other; they may occur as the result of cribbing—a bad habit in which the horse bites the stable fixtures or other objects, thus breaking the teeth; or they may be due to fraudulent means, the horseman striving to give the teeth the characteristics of that period of life in which horses have their greatest value, thus endeavoring to make the young appear old and the old young. This altering the natural appearance of the teeth is called "bishoping." While many are skilled at this work, it is difficult to alter the teeth without detection, though they can no longer serve as an index in estimating age.

CHAPTER V

HISTORY OF THE HORSE

The early history of the horse is both interesting and instructive. It is interesting because of the marked changes that have taken place in the size and conformation. It is instructive because it affords the best-known illustration in existence, of the adaptation of a race of animals to its environment, and shows clearly the influence of selection—whether natural or artificial.

The history of the horse, as now worked out, extends farther back into the past than that of any other farm animal. He was one of the first animals to receive the attention of progressive breeders, his improvement antedating that of cattle, sheep or swine. Nor do we wonder at this when we consider the intimacy of horse and master, their constant companionship, and the dependence of man upon his horse in the chase, in the pursuit of his foes, or in the escape from his enemies.

Antiquity of the horse.—The ancestry of the horse family has been traced back, without a single important break, to the Eocene epoch in the Tertiary period.* During this long period, estimated at three millions of years, the animals of the horse family have passed through important changes in all parts of the body, but especially in the feet and teeth, adapting them more perfectly to their environment. Thus the earliest known ancestors of the horse family differed widely from the horse of the present time. These early ancestors were very small animals, not larger than the domestic cat. They possessed four complete toes on each forefoot and three on each hind-

*The geologist divides time into eras, ages, periods, epochs and the like. Fossiliferous remains of the horse are found in the Tertiary period, which is divided into four epochs, Eocene, Oligocene, Miocene and Pliocene; as well as in both the Quarternary and Recent periods.

foot. Some scientists believe that the still more ancient ancestors possessed five toes on each foot. The teeth of these very early animals were short-crowned and covered with low, rounded cusps of enamel somewhat similar to those of swine, and differing widely from the long-crowned, rather complicated, molars of the horse.

Distribution of prehistoric horse.—In the latter part of the Tertiary and in the early Quarternary periods, wild species of the horse were to be found on every continent except Australia. Remains of the horse have been found in all parts of the United States, in Alaska, in Mexico, in Central and South America, as well as in Europe, Asia and Africa. The first discovery of these fossil horses in the United States was made by Mitchell, in 1826, near the Navesink Highlands in New Jersey. About the middle of the century Leidy made similar discoveries in Nebraska. Following these came other discoveries, until the wide distribution of the horse in America became well established. Specially rich localities are on the Niobrara River in Nebraska, in central Oregon, in the phosphate mines near Charleston, South Carolina, in central Florida, in southern Texas, Arizona, Kansas, Louisiana and many other states. In fact, the fossil remains of the horse are so abundant in deposits of rivers and lakes of the Pleistocene epoch that the formation in the western United States has received the name of Equus Beds.

Evolution of the horse.—The prehistoric development of the horse has been thoroughly investigated by the American Museum of Natural History. Twelve stages have been recognized in the evolution of the horse family from the early Tertiary period to the present; each stage being characteristic of its peculiar geological time, with the horse becoming more and more developed toward the present-day type, as the periods become more and more recent. A few of these stages have been found in various parts of the world, but by far the most complete and best-known series comes from the Tertiary Badlands of our

western states. Of some stages all parts of the skeleton have been found, while of others only the jaws, or jaws and feet, have been discovered. The stages properly grouped are as follows:*

1. *Hyracotherium.*—From the Lower Eocene. This is the most primitive stage known, and only the skull has been found, so that it has not been determined what the feet were like. The teeth display six rounded cusps on the upper molars and four on the lower. The premolar teeth have only one main cusp, except the third and fourth premolars, in each jaw, which have two and three respectively. The animals were no larger than the domestic cat. Found only in London clay, England.

2. *Eohippus.*—From the Lower Eocene. Teeth vary somewhat from above, the molars having the cusps more clearly fused into cross-crests, and the last premolar is beginning to look like one of the true molars. The forefoot has four complete toes and the splint of a fifth. The hindfoot has three complete toes and splint. The animals were about the size of a fox terrier dog and known as "Dawn Horses." Found in New Mexico and Wyoming.

3 and 4. *Protorohippus and Orohippus.*—From the Middle Eocene. In these animals the splints have disappeared, leaving complete toes, as in the Eohippus. The crests in the molars are more apparent, and the last premolar has become almost like the molars, while the next to the last premolar is beginning to assume a similar form. This type was about the size of a small dog, perhaps about 14 inches high. The Protorohippus was found in 1880 in the Wind River Badlands of Wyoming and was described under the name of the "Four-Toed Horse."

5. *Epihippus.*—From the Upper Eocene. Only incomplete specimens have been found of this stage of the evolution of the horse. The molar teeth have the round

*Made up from Guide Leaflet, No. 9. American Museum of Natural History, W. D. Matthew.

cusps almost completely converted into crescents and crests, with another premolar tooth becoming like the molars. There are four toes in front and three behind, but the central toe in each foot is larger, stronger and more important than the toes on either side.

6 and 7. *Mesohippus.*—From the Middle and Upper Oligocene. There are three toes on each foot and a splint representing a fifth toe on the forefoot. The middle toe

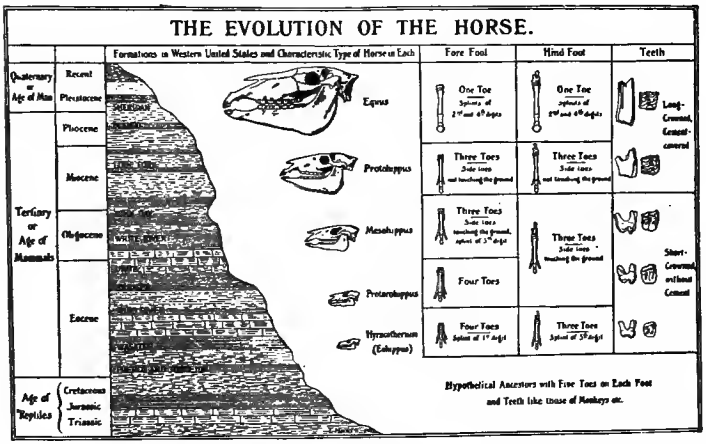


FIG. 48.—CHANGES IN THE SKULL, TEETH AND FEET SHOWING EVOLUTION OF THE HORSE

has become much larger than the side toes, which bear very little of the weight of the body. Three of the premolars have become like full molars, with crests on the crown completely formed. The outside crests in the upper molars have taken the shape of two crescents. The animals found in the Middle Oligocene were about the size of a coyote, while those of the Upper Oligocene were as large as a sheep. Of these species all parts of the skeleton are known.

8. *Anchitherium.*—From the Lower Miocene. This stage is much like the Mesohippus, but is larger and has

the crests of the teeth higher and more complete. Some persons think that this form is not in direct line of descent, and consider it a side branch. Found in both America and Europe.

9. *Parahippus and Hypohippus.*—From the Middle Miocene. In Parahippus the crests of the teeth are much higher and the upper molars are changing in form, a second pair of crescents appearing inside the outer pair. Like Anchitherium, Hypohippus is off the direct line of descent. The teeth of the two forms are much alike, and they are often confused, though Hypohippus is much larger, equaling a Shetland pony in size, a specimen of this size being found near Pawnee Buttes, Colorad in 1901. The forefoot has small rudiments of the first fifth toes, but there is no splint of the fifth, as in Mes hippus. The second and fourth toes still touch th ground, though lightly. These animals have been calle the "Forest Horses," and are supposed to have lived forests and on lowlands. The feet of Parahippus w much like those of Hypohippus, with side toes smaller.

10 and 11. *Protohippus and Pliohippus.*—From the Middle and Upper Miocene. The crowns of the upper molars have become much longer, the two pairs of crescents on the upper molars are complete, with two half-separated cusps within the inner pair. Cement fills the valleys between the crests, so that with the wear of the teeth th edges of hard enamel are backed inside the dentine and outside the cement. Thus the surface of the tooth has a series of enamel ridges projecting somewhat above the grinding surface, due to the softer material on each side wearing down into hollows, yet never breaking off, because they are braced so thoroughly on each side. This provides an efficient instrument for grinding hard grasses. In these two forms, especially Protohippus, the crowns of the teeth are not so long as in the modern horse.

The feet in these two forms have but one toe touching the ground. The side toes are complete, but are more

slender than in the earlier stages and are useless, as they do not reach the ground. In some species of Pliohippus they have almost disappeared. The forefoot of Protohippus still retains small nodules of bone, which are the

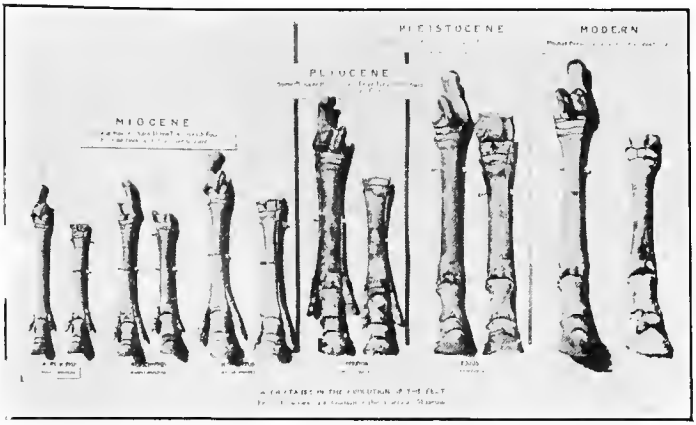


FIG. 49.—CHANGES IN THE LEGS AND FEET SHOWING EVOLUTION

remains of the first and fifth toes. The animals of this period were about 40 inches high.

12. *Equus.*—From the Pleistocene and Recent. This is the stage of the modern horse. The side toes have disappeared and are represented by splints on the fore and hind foot. No trace remains on the forefoot of the small nodules, which in Protohippus represented the first and fifth toes. The crowns of the teeth are much longer, and of the two half-separated inner columns on the upper molars, one has disappeared, while the other has increased in size and changed in form. The skull has lengthened and the animal is much larger.

Meaning of the change in feet and teeth.—Along with the disappearance of the side toes there is considerable increase in the length of the legs, especially of the lower part. The surface of the joints, at first more or less of

the ball-and-socket kind, which allows free motion of the limb in all directions, becomes keeled and grooved like a pulley wheel, permitting free motion forward and backward, but limiting the motion in all other directions and increasing the strength of the joint. The increased length of the lower leg increases the length of the stride without decreasing its quickness, thus giving the animal greater speed; and the heavy muscling in the upper leg in connection with the increased strength at the joints gives greater strength. Additional strength is obtained by the consolidation of the two bones of the forearm (ulna and radius) and of the leg (tibia and fibula).

The increase in the length of limb renders it necessary for the grazing animal that the head and neck should increase in length in order to enable the mouth to reach the ground. The increase in length and crown development of the teeth enables the animal to subsist on the hard, comparatively innutritious grasses of the dry plains, which require much more thorough mastication before they can be used as food than do the softer green foods of the swamps and forests.

All these changes in the evolution of the horse are adaptations to a life in a region of the level, smooth and open grassy plains which are now his natural habitat. In the beginning, the race was better fitted for a forest life, but it has become more and more completely adapted to live and compete with its enemies or rivals under conditions which prevail in the high, dry plains. The increase in size, which has occurred during this evolution, is dependent on abundance of food. While a large animal requires more food in proportion to its size than does a small one, in order to keep up a proper amount of activity, yet the large one is better fitted to defend itself against its enemies and rivals. Thus, as long as food is abundant, the large animals have the advantage of the smaller ones and tend to become continually larger until a limit is reached, when sufficient food becomes difficult to obtain,

the animal being compelled to devote all its time to getting enough to eat.

Cause of the evolution.—The evolution of the horse, adapting him to live on the dry plains, probably went hand in hand with the evolution of the plains. At the beginning of the Age of Mammals the western part of the North American continent was not as high above the sea level as now. Much of the country had but recently emerged, and the Gulf of Mexico stretched far up the Mississippi valley. The climate was probably very moist, warm and tropical, as is emphasized by the tropical forest trees found fossil even as far as Greenland. Such a climate, with the low elevation of the land, would favor the growth of dense forests, and to such conditions of life the animals of the beginning of the mammalian period must have been adapted.

During the Tertiary period the continent was steadily rising above sea level. At the same time other influences were at work rendering the climate continually colder and drier. The coming of a cold, dry climate thinned and restricted the forests and in their place appeared the open grassy plains. The early forest inhabitants were forced either to retreat and disappear with the forests or adapt themselves to a life on the plains. The ancestors of the horse, following the latter course, changed with the changed conditions, and the race became, as it is today, perhaps the most specialized of animals in its adaptation to its environment.

First uses of the horse.—The first association of man with the horse, so far as discovered, existed in the Early Paleolithic or Chipped Stone Implement Age. The earliest evidence of the existence of primitive man is his crude implements chipped from stone, and since these are found in caves, river gravels and rocks associated with the fossil remains of the prehistoric horse, we have no history of man which is not associated with that of the horse. It is assumed that man first hunted horses for

food, then drove them, then used them for riding and finally used them as beasts of burden. That the horse was used for food is emphasized by the frequency with which the remains of the prehistoric horse are found associated with those of the primitive man in both the

FIG. 50.—HUNTERS

Mammoth and Reindeer Age of the Paleolithic and in the Neolithic.

That the horse was driven before used for riding seems to be borne out by this evidence, nor is this strange when we consider the small size of the prehistoric horse. When the horse was first domesticated is not definitely known, perhaps in the Neolithic, as this seems to be established by the findings among the Swiss lake dwellers. The horse was used extensively for driving during the Bronze Age, as is evidenced by the frequency with which the remains of man, horse and chariot are found in the caves, river gravels and rocks.

The early domestication of the horse was the result of necessity. Primitive man needed help in the hunt, he was not as strong as many of the animals about him and no match for them in battle, he was not as fleet of foot as most game that he hunted, nor could he trail by scent as the wolf. Thus primitive man was not long in discovering that his chief advantage lay in his wits. His attention must have been very early attracted to the horse on account of his fleetness and to the wolf on account of his hunting habits, as these were the first animals domesticated. With his horse and his dog, man was match for anything that roamed the forest or the plain, and with them he established and made good his claim as master of all creation.

Existing species of wild horses.—There are now no known wild representatives of the true horse (Equus caballus), although related species run wild in the open arid desert plains of central Asia and Africa. There are two species in Asia, the Asiatic Wild Ass (Equus hemionus and Przewalsky's Horse (Equus Przewalskii), while in Africa there are the African Wild Ass (Equus asinus) and the several species of Zebra. In the Americas and Australia there are no wild horses. The mustangs and bronchos of the western plains and South America are feral (domesticated horses run wild), and descended from the horses brought over from Europe by the white settlers. Thus when the New World was discovered by the Spaniards they found no horses on either continent. The Indians were unfamiliar with them and at first regarded the strange animals with wonder and terror.

Why the horse should become extinct in the Americas is not known and seems strange in view of the fact that both the prehistoric and modern horse found conditions agreeable to development. He may have been unable to stand the cold winters, probably longer continued and more severe during the Ice Age than now. The com-

petition with the bison and the antelope, which had recently migrated to America, may have made it more difficult than formerly for the horse to get a living. Probably primitive men in the hunt played a large part in extinguishing the race. Some unknown disease or prolonged season of drouth may have aided in the extermination.

Ancestors of modern horse.—The connecting link between the prehistoric horse and the modern horse is not definitely known, but is assumed to be the present form of zebra, the Asiatic and African wild ass, and Przewalsky horse. The latter was discovered on the desert of Zungaria in western Mongolia in Asia by Poliakoff, in 1881. This animal stood about 40 inches high and is assumed to be similar in type to the horse as known by primitive man. The drawings left by the European cave dwellers show a strong resemblance to this type, and it is probable that from such an ancestor have come the ponies of northern Europe as well as of Mongolia and China.

CHAPTER VI

THE BREEDS OF HORSES

A breed may be defined as a group or class of animals possessing a number of distinctive qualities and characteristics in common, which are so firmly fixed as to be transmitted with reasonable certainty under suitable environment. In America, there are six rather common breeds of light horses, four of coach horses, six of draft horses, five of ponies, and six of jacks.

Establishing a breed.—A breed is usually started by one, two or more superior animals which have been produced in a locality by reason of better food, more agreeable environment and intelligent selection. Inbreeding is often practiced to a greater or less extent for the purpose of perpetuating and intensifying one or more of the desired characteristics. As a rule, this work is carried on by one, or at most a few, of the more intelligent breeders, who, by improving conditions, have first improved the quality of their own horses. This work is continued until a number of animals are produced, each possessing the desirable characteristics and having them so strongly fixed as to be uniformly transmitted. The American saddle horse furnishes a typical example. Denmark, the most distinguished saddler of his time, was bred to "Stevenson's mare," and produced Gaine's Denmark, Muir's Denmark and Rob Roy. These animals, more especially the former, proved great breeding stallions, and from them are descended many of the best saddle horses.

From time to time, one or more animals with superior characteristics are selected from a breed and these are closely bred for a time, producing a variety or "family." The Hambletonian family of trotters, descending from

Hambletonian 10, furnishes a good example; for to him may be traced the most illustrious trotters of history.

The breed stud book.—When the founders of a breed decide that the distinctive characteristics are reasonably well fixed, they publish what is known of the breeding of the better animals and call the volume, in which this record of breeding appears, a stud book. Thus the breed makes its official appearance. It will readily be seen that when an attempt is made to start a breed, the first pedigrees must be based on unpublished records. Frequently the foundation stock is recorded simply by name, and nothing is said of the ancestors, because nothing is known. At first the rules governing the registration are not difficult, and half-bloods, three-fourths bloods, and even animals of unknown origin are sometimes registered. As years go by, however, the rules for admission to registration are made more strict, and finally no animal is eligible for record whose sire and dam are not recorded.

The stud book stimulates maintenance of breed purity; it certifies to a line of descent from ancestors of high class, and is a most important factor in live stock improvement. Other things being equal, the longer the breed has been established the greater are the chances that the offspring will closely resemble its ancestors in all of its characteristics. If one is familiar with the breed under consideration, he will quickly recognize the names of the superior animals recorded in the pedigree. This will naturally lead to a study of the history and performance, which is likely to result in an endeavor to improve the breed along definite lines, and this in turn serves to stimulate an honest pride in the breeder's profession.

Records of performance.—The main use of the stud book is to preserve a record whereby we may trace the descent of our animals to the purest source, but it tells us nothing of the individual merits of the animals recorded. If this register could be supplemented by a record of performance, it would be of greater value still.

This is emphasizd by the advancement made in breeding Standardbred horses, where an accurate record of the performance of each animal is recorded in Wallace's Year Book; also by the recent advancement made in breeding dairy cattle, where an accurate record of the amount of milk and butter fat produced by each cow is made in the Advanced Registry.

The difficulty in keeping a record of performance among horses, other than the trotters and pacers, comes in knowing what characteristics to record; but it is hoped in the near future some characteristics, which will prove of merit, may be decided upon and an accurate record made of them, as such would be of great value in selecting breeding stock and in mating.

The light breeds.—The several breeds of horses, as we find them, have been developed along certain definite lines to meet given conditions. Thus, we have the various light breeds developed to perform rather light, but very fast work; the coach breeds for stylish action and heavy coach work; the draft breeds to perform heavy draft work, and the like. The light breeds were developed under conditions fundamentally different from those that resulted in the heavy phlegmatic drafter.

Each of the light breeds of horses owes its improvement, in part at least, to horses from the East, particularly Arabia, Turkey, Persia and the Sahara region. Conditions in these countries are such as to develop rather light horses of quality and endurance. Arabia, especially, is noted for the quality of her horses, as the rather dry, barren soil makes it necessary for the animals to graze over large areas to get sufficient nutrients. Thus a natural selection is continually at work and only those animals of quality and endurance survive. Further, it is stated, that the forage, though scant, stimulates the development of dense firm bone. It would seem, therefore, that high lands, possessing a rather dry climate and pro-

viding a scant but nutritious forage, furnish ideal conditions for development of the light breeds.

Since the breeds of light horses are useful for light, fast work, they possess many characteristics in common, yet a detail consideration reveals much difference in both size

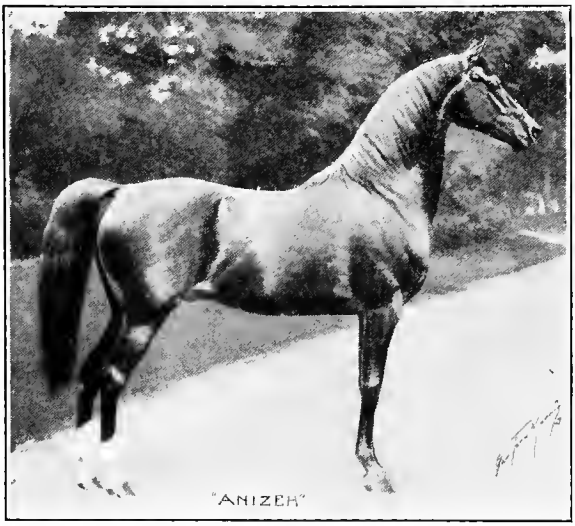


FIG. 51.—LIGHT BREED. ARABIAN STALLION "ANIZEH"

and conformation. Thus the Arabian horse is a small, symmetrical animal of great beauty. There is a peculiar balance and harmony throughout that must be seen to be appreciated. The Thoroughbred horse is more upstanding, his joints and muscles are more prominent and he represents the highest possible development of muscular energy. The American trotter, though lean and angular, possesses more general symmetry than the Thoroughbred. The American saddler has been justly called the most beautiful modern breed. The graceful form and smooth, frictionless action are remarkable examples of the results of skillful breeding.

TABLE GIVING NAME, NATIVE COUNTRY, HEIGHT, WEIGHT, USES AND COLOR OF EACH OF THE BREEDS OF LIGHT HORSES

Name of breed	Native country	Height, hands Weight, pounds	Uses	Most frequent color
Arabian	Arabia	14 – 14.2* 800 – 1,000	Riding	White, Bay
Thoroughbred	England	14.2 – 16.2 900 – 1,050	Racing, hunting	Bay, brown
Standardbred	United States	15 – 15.3 900 – 1,150	Driving, racing	Bay, brown, black
Orloff Trotter	Russia	15.3 – 16.2 1,100 – 1,300	Driving, racing	Gray, bay, black
American Saddler	United States	15.1½ – 15.2½ 950 – 1,050	Riding, driving	Bay, brown, black
Morgan†	United States	14.3 – 15.3 900 – 1,150	Driving, riding, racing	Bay, chestnut

* 14.2 equals 14 hands and 2 inches. All heights are recorded in this manner in this book.

† Usually not considered a breed, merely a family of the Standardbred.

The draft breeds.—The horse is very susceptible to climatic conditions, perhaps more so than any other animal domesticated by man. Temperate climate, fertile, grassy plains with abundant nutrition, produce horses distinguished for size and strength; and, as we have seen, high lands and mountain ranges, with bleak, cold climate and scanty subsistence, dwarf the frame and produce a hardy, diminutive animal. There is no exception to this in Nature, though man may do much by supplying warm stables and abundant food, and by selection to counteract the influence of climate, but with the utmost care the tendency will be much as suggested. Thus the fertile plains of Germany and France (Flanders region), with their agreeable climate and abundant herbage, have pro-

duced the ponderous draft horse, which still distinguishes the region, and has been the source from which all the countries have drawn the foundation for their draft breeds.

Since the breeds of draft horses are used for heavy draft, they possess most of their characters in common.

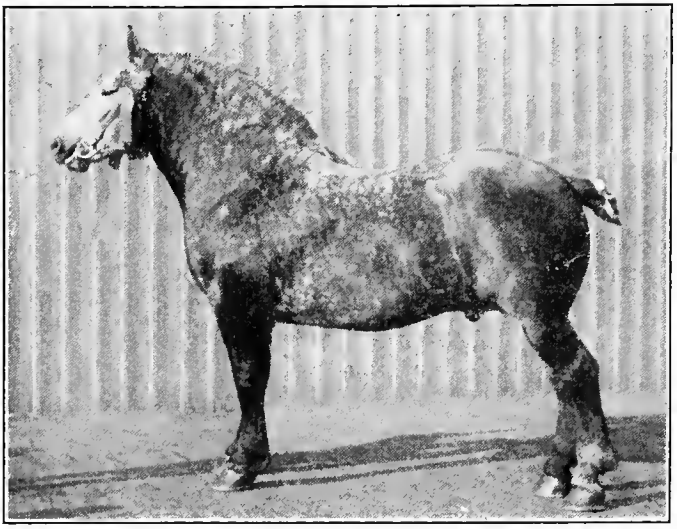


FIG. 52. DRAFT BREED. PERCHERON STALLION "INTITULE"

There is less difference between the heavy breeds than among the light breeds, though a detail study reveals variation. Thus, the Percheron horse is a large, massive, smooth, short-bodied, clean-legged drafter, often possessing a rather short rump with tail set low. The French draft horse appears much the same, though as a breed the animals lack uniformity. The Clydesdale is equal to the Percheron in weight, but lacks in massiveness, in that he is more upstanding and longer in the body. Long hair grows from the back of the cannons. The English Shire

resembles the Clydesdale in general appearance, but is more massive, possessing shorter legs and a larger and deeper body. The Belgian horse has a very compact form, a full body with short rump and tail set low, and clean legs. The Suffolk horse is not so large as the other draft breeds, but is rather massive and noted for depth of body. The legs are clean.

TABLE GIVING NAME, NATIVE COUNTRY, HEIGHT, WEIGHT, USES AND COLOR OF EACH OF THE BREEDS OF DRAFT HORSES

Name of breed	Native country	Height, hands Weight, pounds	Uses	Most frequent color
Percheron	France	15.2 – 17 1,800 – 2,300	Heavy hauling	Black, gray
French Draft	France	15.2 – 17 1,800 – 2,300	Heavy hauling	Black, gray
Clydesdale	Scotland	16 – 16.2 1,800 – 2,300	Heavy hauling	Light bay
Shire	England	16 – 17 1,800 – 2,300	Heavy hauling	Light bay
Belgian	Belgium	16 – 17 1,600 – 2,300	Heavy hauling	Bay, black, brown
Suffolk	England	16 – 17 1,600 – 2,000	Heavy hauling	Chestnut

The coach breeds.—The coach breeds owe their improvement, in part at least, to the light breeds, particularly the Thoroughbred, which was used more or less in the formation of each of the coach breeds. Since the coach breeds are useful for stylish action and heavy coach work they each possess many characters in common, but a detail consideration reveals great variation. Thus the Hackney coach horse is a rather small, symmetrical animal with intelligent head, neat neck, strong level back, power-

ful loins and short legs, and possesses stylish action. The French coach horse is large, though smooth, with a body of good length, an arching neck, strong loin and level croup. The German coach horse is still larger, with a broad deep body, powerful loins and legs of good length. The Cleveland bay coach horse is more upstanding, with a rather long, though symmetrical body, sloping shoulders and a high, broad croup. The action of the French coach, German coach and Cleveland bay is long and powerful, rather than high and stylish, as in the Hackney.

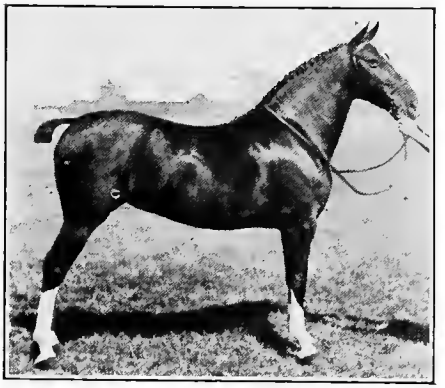


FIG. 53.—COACH BREED. HACKNEY MARE "QUEEN OF DIAMONDS"

TABLE GIVING NAME, NATIVE COUNTRY, HEIGHT, WEIGHT, USES AND COLOR OF EACH OF THE BREEDS OF COACH HORSES

Name of breed	Native country	Height, hands Weight, pounds	Uses	Most frequent color
Hackney	England	15.2 – 15.3 1,000 – 1,200	Park driving	Chestnut
French Coach	France	15 – 16 1,200 – 1,350	Coach driving	Bay, brown, chestnut
German Coach	Germany	16 – 16.2 1,350 – 1,450	Heavy coach driving, general utility	Black, brown, chestnut
Cleveland Bay	England	16 – 16.3 1,200 – 1,550	General utility	Bay

The pony breeds.—The various breeds of ponies owe their small size to adverse climatic conditions and scanty subsistence. The pony breeds vary greatly in both size and conformation, according to the environment. Thus, the Shetland pony is a very diminutive animal, but possessing a conformation similar to a small draft horse; the Welsh pony is more upstanding, and while varying considerable in conformation, is somewhat similar in this respect to the light breeds; the Exmoor pony is equal in size to the larger type of Welsh ponies, which it resembles slightly in conformation, though is more massive; while the Hackney and Arab ponies are simply Hackneys and Arabian horses under 14.1 hands high.

FIG. 54.—SHETLAND PONY

TABLE GIVING NAME, NATIVE COUNTRY, HEIGHT, WEIGHT, USES AND COLOR OF EACH OF THE BREEDS OF PONIES

Name of breed	Native country	Height, inches Weight, pounds	Uses	Most frequent color
Shetland	Shetland Islands	34 – 44 250 – 400	Driving, riding	Black, brown
Welsh	Wales	48 – 56 400 – 600	Driving, riding	Brown, gray
Exmoor	Devonshire	48 – 56 500 – 700	Driving, riding	Bay, gray
Arabian	Arabia	Under 56	Driving riding	White, bay
Hackney	England	Under 56	Driving, riding	Chestnut

The breeds of jacks.—The several breeds of jacks vary in conformation and size, though the difference is not so marked as in horses. The variations in jacks are brought about by the same condition as in the horse. The Andalusian jack is of medium size, with excellent bone possessing much substance; the Maltese jack is of small size, with rather fine bone and perhaps too much general refinement; the Catalonian jack is of large size, possessing unusual style, beauty and action; the Majorca jack is the largest, standing a hand higher than the Catalonian, but the animal is sluggish in action; the Italian jack is the smallest, though well proportioned and possessing good quality; while the Poitou jack is of medium size, possessing large bone of much substance.

TABLE GIVING NAME, NATIVE COUNTRY, HEIGHT, USE AND COLOR OF THE BREEDS OF JACKS

Name of breed	Native country	Height, hands	Use	Most frequent color
Andalusian	Andalusia, Spain	14.2 15.2	Siring mules	Gray
Maltese	Malta Island	14 – 14.2	Siring mules	Brown, black
Catalonian	Catalonia, Spain	14.2 – 15.2	Siring mules	Black, brown
Majorca	Majorca Island	15 – 16	Siring mules	Black
Italian	Italy	13 – 14	Siring mules	Blue, black
Poitou	France	14.2 – 15	Siring mules	Black

Mule and hinny.—The mule is not a true breed, as often considered, but is a hybrid, as is the hinny. The mule is the product of a cross between a jack and a mare,

whi' the hinny results from crossing a stallion and a jen... Being hybrids, both the mule and the hinny are sterile and will not breed, though several cases are on record of mare mules getting in foal and producing to a stallion. While the mule has been known many centuries, and is a very useful animal, the hinny is seldom seen and plays no part in economic industry.

Breed study necessary.—The horse breeder should have a knowledge of the early development and peculiarities of the breeds of horses. He should know that Percheron improvement was due to an infusion of Arabian blood and that until recently this breed was small and not a heavy horse, hence the bone of the Percheron horse is to be carefully observed. The breeder should know that the Clydesdale has a rather short rear rib, with a tendency to ranginess of body; that the Shire has a tendency to straight shoulders, straight pasterns and flat feet; and that the Suffolk is often criticized for lack of quality in his feet. The horse breeder must be aware of all such peculiarities in order that he may guard against them in selecting breeding stock.

CHAPTER VII

THE ARABIAN HORSE

Although the Arabian horse played an important part in the formation of practically all modern breeds of horses, it is only recently that an organization has been formed for its promotion. This breed performed its part in the development of the horse because of merit.

The native home of the Arab horse.—Arabia is the native home of the Arabian horse. This is a vast country some 1,500 miles long and from 400 to 1,000 wide, lying east of the Red Sea, with the northern boundary not far from the east end of the Mediterranean Sea. Though large, its chief characteristic is the barrenness and aridity of its soil. The inhabitants, called Bedouins, are of two classes, the agriculturist and the warrior. The former is, of course, the more domestic, while the latter is migratory, having no occupation other than war, and keeps at least one mare always saddled so that he may spring on her back at the slightest alarm. While there are several groups of these desert Bedouin tribes, the most powerful are the Shammar race of Mesopotamia, in the north and to the east of the Euphrates, and the Anezah in the south. Turkey, Persia and parts of northern Africa, notably the Sahara region, also possess many Arabian horses. These countries and others are often collectively spoken of as the "Orient" (the East) and their horses as "Oriental horses."

The origin of the Arabian horse.—The early history of the Arab horse is obscure. Youatt states that as late as the seventh century the Arabs had few horses and those of little value. Major Upton and Lady Anne Blunt, who lived among the Bedouins for months, Blunt with the Shammar and Upton with the Anezah, and spoke their

language, give what is accepted to be more definite and satisfactory information on the subject. They trace the origin back to the time of Ishmael, whom they say probably was contemporary with Isaac. According to the tradition, Ishmael inherited a valuable horse from the Kuhl race of very remote antiquity. The Anezah tribes who, by common consent of all the Bedouins, are the most wealthy, the most powerful, and have the best horses,

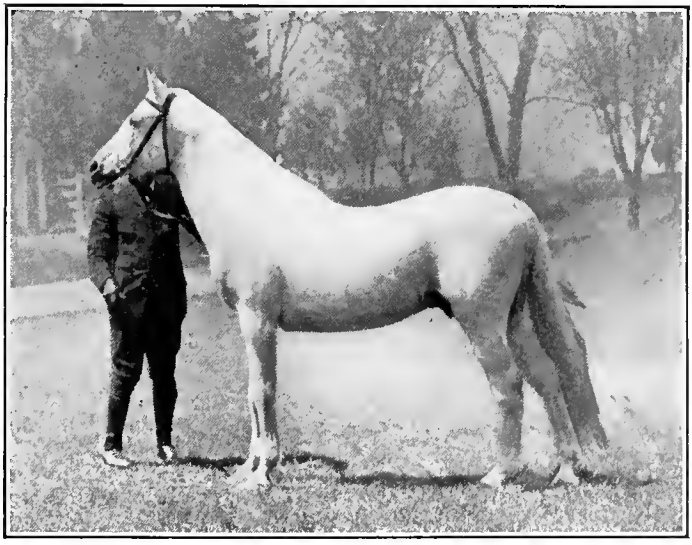


FIG. 55.—ARABIAN STALLION "OBBEIAN"

descended in a direct line from Ishmael through Sheik Salaman, four generations removed from Ishmael. Salaman lived about 1635 B. C., and owned five famous mares called "Al-Khamseh" (the five). The blood of the Kuhl race has been preserved in these mares and from this ancestry has come the purest and best Arab horses.

Families of Arab horses.—According to Upton there are five great families of Arabian horses descending from

foundation stock tracing to the five Al-Khamseh mares. The names are as follows:

1. Keheilet Ajuz and descendants.
2. Maneghi, with four sub-families.
3. Hadban, with five sub-families.
4. Jelfon, with two sub-families.
5. Homdani, with two sub-families.

From Keheilet Ajuz comes the most distinguished Arabian blood. According to tradition, this family

FIG. 56.—ARABIAN STALLION "ANTOE"

descended from a mare that gave birth to a filly colt when on a long and rapid journey, her master being pursued by an enemy. He left the colt where foaled and continued his journey, reaching his own camp after much difficulty. To the great surprise of all, the young filly came in also a few hours later, having followed the dam. The foal was placed in charge of an old woman, who raised her, hence the name Keheilet Ajuz ("the mare of the old woman"), Ajuz meaning woman and Keheilet

mare, while Keheilan signifies stallion. Keheilet and Keheilan are derived from the word Kuhl, which means antimony, a substance which Arabian women use to blacken their eyebrows and eyelashes.

Upton states that the entire race of pure-bred horses of the Anezah have black skins irrespective of coat color, which he thinks accounts for the use of the words Keheilet and Keheilan. The Anezah Bedouin, however, declines to consider any animal as Keheilet or Keheilan, the pedigree of which does not go back to the five Al-Khamseh mares of Salaman.

Descendants of Keheilet Ajuz.—According to Upton 37 strains or sub-families have descended from Keheilet Ajuz, five through mares and 32 through stallions, in addition to eight other families, some of which are so distinguished as to be confused with the five Al-Khamseh mares. The eight families that are of recognized merit are as follows:

1. Seglawi, with three sub-families.
2. Abeyan, with seven sub-families.
3. Dalman, with four sub-families.
4. Abu Arkab, with three sub-families.
5. Rishon, with two sub-families.
6. Radban, with three sub-families.
7. Twaissan, with two sub-families.
8. Milliah, with two sub-families.

The influence of the Arabian horse.—As early as the reign of King James I. (1603-1625) Arabian horses were imported into England and crossed with the light horse stock, though it was not until after the middle of the century that the English began to appreciate the importance of Oriental blood. During the reign of Charles II (1660-1685) the so-called "Royal Mares" were imported, while during that of William and Mary (1689-1702), Anne (1702-1714) and George I. (1714-1727), Byerly Turk, Darley Arabian and Godolphin Bard were

introduced, and became foundation stock of the Thoroughbred. From Darley Arabian is descended the best Hackney blood. Since the time of James I. many eastern horses, J. Osborne placing the number at 164, have been imported to England. These played an important part in the formation and improvement of both the Hackney and the Thoroughbred. Of this number, Osborne says 90 were Arabs, 36 Barbs, 32 Turks, four Persians and two of unknown ancestry.

The Arabian horse was used in the improvement of the French horses. In 1820 two Arabian stallions—Godolphin and Gallipoli—were used upon French mares, and did much to improve the quality, action and style of the French horses. As these sires were gray, no doubt they had considerable influence in developing the gray color among the horses of La Perche. The horses of Germany, Russia and Hungary have been much improved in quality and action by the use of eastern sires.

The Arabian horse in America.—The early accounts of the Arabian horse in America are conflicting, due, in part at least, to the fact that many horses called Arabian were not of that breed, but were of Oriental ancestry. The first record we have of the Arab in America was the importation of the stallion Ranger about 1765 to New London, Connecticut. This horse was later taken to Virginia, where he became known as Lindsay's Arabian. In 1838 J. D. Elliott imported a number of both sexes. In 1856 Hon. A. Keene Richards imported three stallions and two mares to Georgetown, Kentucky. Three Arab horses, Maanake, Hedgrogi and Liklany Gidran, were presented to William H. Seward; one, Umbark, to President Martin Van Buren; and two, Linden Tree and Leopard, to General U. S. Grant. A number were brought to the World's Fair, Chicago, in 1893, some of which were destroyed by fire and the remainder purchased by Peter B. Bradley of Boston, Massachusetts.

Arabian horse breeders.—During recent years a num-

ber of Arabian studs of importance have been maintained in England and America. In England the late Major Upton and the late Henry Chaplin, Minister of Agriculture, maintained pure Arab studs, both of which were sold. Lady Anne Blunt of Crabbet Park, near Threebridges Station, Sussex County, England, and her husband, Sir Wilfred, are the largest breeders of pure Arab horses in England, and for 20 years or more have bred,

FIG. 57.—ARABIAN MARE "HAMRA"

with the greatest care, the best stock that the desert has ever furnished the outside world. In the summer of 1911, Henry K. Bush-Brown saw about fifty head of pure Arabians in the Blunt stud. These were divided into seven different sub-families and possessed superlative merit. In addition, Rev. F. F. Vidal and Miss Ethelred Dillon also have studs in England.

In America, Randolph Huntington of Oyster Bay, Long Island, New York; Peter Heyl of Milwaukee, Wisconsin; and J. A. P. Ramsdell of Newburgh, New York, have

maintained notable Arabian studs in recent years. In recent years the most prominent breeders are or have been Homer Davenport, Holmdel, New Jersey; Peter B. Bradley, Boston, Massachusetts; Richard W. Tully, Pleasanton, California; Spencer Borden, Fall River, Massachusetts; and the Hartman Stock Farm, Columbus, Ohio. These are breeders of pure Arabs and their combined studs represent a total of over 100 head of horses in this country. Some of these were imported from Lady Blunt's stud and some by the Hamid Hippodrome Company (who showed their horses at the Chicago World's Fair) and others. Huntington was the pioneer at this kind of breeding. Davenport and Borden imported direct from the Bedouins.

Notable Arabian horses.—The desert-bred Arab stallion Kismet was perhaps the most noted. He was imported to England by Rev. F. F. Vidal of Needham Market, Suffolk, England, who was offered $20,000 for him by the French government, but declined the offer. Huntington tried repeatedly to buy Kismet, but finding it impossible to purchase him outright arranged a contract to bring him to the United States. The contract provided heavy bonds, including one in Lloyd's insurance agency, for Kismet's safe return to England, in addition to a large fee for use in Huntington's stud.

Thus bonded, Huntington imported Kismet in 1891. The journey proved a hard one, and on his arrival Kismet was sent to the Cattanach infirmary, New York city, with a temperature of 106, resulting from pleuro-pneumonia, and died a few hours later, causing great financial loss to Huntington. Kismet's skeleton, said to be one of the most remarkable ever seen, is preserved in the American Veterinary College, 151 West Fifty-fourth street, New York City, and used as a specimen in clinical lectures. Other famous stallions are El Emir, Maidan, Kouch, Kars, Shahwan, Himyarite, Anizeh Khaled and Haleb. Among the mares Haidee, Keziah, Naomi, Nazli, Naarah

and Wadduda are important modern females of the breed.

Description of the Arab horse.—In his purity the Arabian horse is of high courage, possessing balance and harmony, power and substance, combined with elastic and graceful movements. He is gentle and affectionate, seemingly having no fear. His strength is remarkable considering size, which is due in part to the large muscle development, thus enabling him to carry heavy burdens. He has a great constitution and extraordinary staying power. While he is not noted so much for speed, as he is not nearly the equal of the Thoroughbred or Standardbred in this respect, yet he can perform long journeys across country with comparative ease, such as those requiring extraordinary endurance.

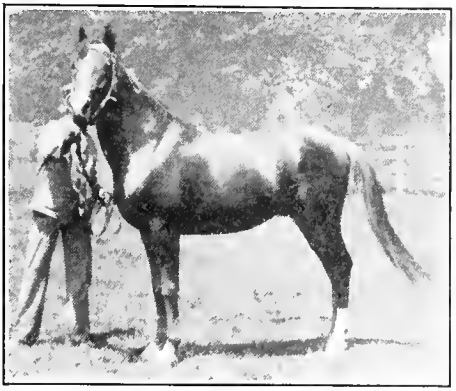


FIG. 58.—ARABIAN STALLION "DEUX"

The head of the Arabian horse indicates superior character and intelligence, the forehead being broad and full, and the head tapering toward the nose more than in other breeds. The nostrils are prominent and capable of great distention; the eyes soft and intelligent, and the ears are of fine texture and pointed inward. In general outline, the head is lean and clean cut, representing high spirit. The neck is of medium length and sustains the head gracefully; the throat of medium size and the windpipe prominent, thus promoting staying power. The shoulders are long and sloping, though Hayes states that from a saddle point of view they are often thick and the withers

low and broad. The chest is deep and long, indicative of constitutional capacity. The body is deep; the back is short; the loins broad and of immense power; and the quarters long and strong, with the whole beautifully turned. The tail is set high and carried with style. The legs and feet are superior.

In height the Arabian horse ranges from 14 to 14.2 hands; thus he is often classed as a pony, and in fact, many of the most famous Arabs brought to England were ponies. Esabin Curtis, an importer of Arabs to Bombay,

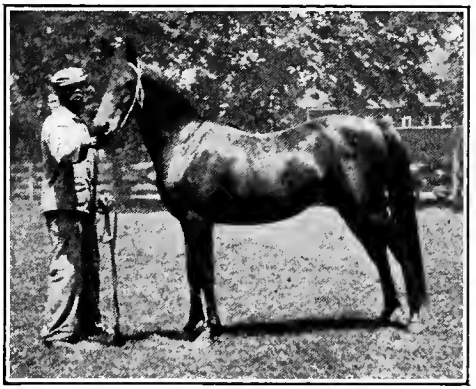


FIG. 59.—ARABIAN STALLION "MALEIK"

is said to have stated that the best Arabs did not, as a rule, exceed 14.1½ to 14.2 hands high, though Homer Davenport states more stand 14.2 hands than any other height. The size is largely a matter of the feed given the horse when a colt. This is emphasized by the fact that among the Gomussa tribe of the Sabba Anazeh, who pay better attention to their horses than do others, we find colts at two years of age standing 15 hands high.

The color varies, and may be white, gray, bay, chestnut, brown, but rarely black. The bays often have black points and generally one or more white feet, with some

white on the face. The chestnuts vary from brightest to dullest shades. According to Davenport, roan, spotted or piebald and yellow colors are not found among the Arabs, though roan and yellow are common among Barbs.

Popularity of the Arab horse.—In the past, the Arabian horse's value has been incalculable, as he has transmitted constitutional vigor, quality, intelligence and style to practically all the modern breeds. At the present, however, it is thought that he has served his usefulness in this capacity, though European governments are using the Arab to improve their depleted horse stock. In 1899 the French government crossed 60 Thoroughbred mares with Arabian stallions, in order to obtain cross-bred stallions, for service in low, soft districts, where the horses are coarse and of inferior bone. In addition, the Arab horse is used to some extent in breeding Welsh, Exmoor and other ponies to produce small animals for polo playing. Thus it seems that the present use of the Arabian horse is quite largely limited to sports and to show.

Organizations and records.—The Arabian Horse Club of America has established a stud book and provides for registration, one volume of which has been published, recording 127 pure Arabians. In England, registration is provided for in the General Stud Book of Great Britain.

CHAPTER VIII

THE THOROUGHBRED HORSE

Of the modern breeds or horses, the Thoroughbred was the first to receive systematic attempts at improvement. For more than three centuries this breed has been considered as the fountain head from which much of the quality and endurance among horses have been derived.

The native home of the Thoroughbred horse.—England, the largest and most densely populated division of the British group, is the native home of the Thoroughbred horse. The climate is moist, temperate and adapted to barley, oats and pasture, thus providing ideal conditions for the development and improvement of the horse. Another factor of vital importance in the development of this breed is the temperament of the English people, who for more than 1,000 years have fostered racing. The sport-loving Cavaliers of England played a very important part in founding and developing this renowned breed of running horses.

The origin of the Thoroughbred horse.—A knowledge of the early history of Great Britain is necessary for a complete understanding of the origin of the Thoroughbred horse. There are no indications of any horses having been indigenous to Britain. The horses with which the islands were first stocked are generally held to have been derived from the pony types, native to northern Europe, though recent researches by Ridgeway indicate that horses of the north African type were in Ireland as early as the sixth century; yet, whatever the source, these early horses were small of stature. We know that the first efforts at improvement were in the attempt of increasing the size.

Early racing in England.—The horse, as a feature in the sports of the times, is first mentioned in the latter half of the twelfth century, when races of a primitive character were conducted at Smithfield. The first race reported was run between Richard II. and the Earl of Arundel in 1377. Henry VIII. was the first king who ran horses for his own amusement. He maintained a royal stud, had laws enacted regarding horse breeding,

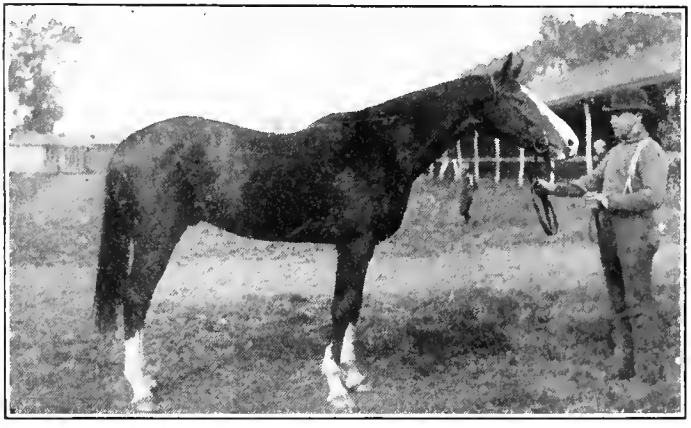


FIG. 60.—THOROUGHBRED STALLION "CHOCORNAE"

and imported from Turkey, Spain and Naples. Systematic racing, however, did not begin until the time of James I., who is credited with having imported the first Arabian for the purpose of breeding horses of greater speed. In 1616, through an English merchant, James I. imported from the Orient a stallion named Markham's Arabian, for which he paid £500. This horse was a failure in the stud and was much ridiculed. Charles I., son of James I., established racing at Newmarket and Hyde Park. He also passed laws encouraging horse breeding.

Foundation stock.—According to British authors, the Thoroughbred was created by Charles II., son of Charles I. He not only took an active interest in racing, but imported direct from the Orient. His most notable importation was that of two Barb mares, which, with their descendants, are commonly known as the "King's mares" or "Royal mares," and are regarded by some authorities as the foundation dams of the breed. Others, however, doubt the accuracy of thus limiting the base of the breed. By far the more noted of the foundation animals are the three famous foreign stallions, Godolphin Barb, Byerly Turk and Darley Arabian.

Three famous Oriental sires.—During the formation of the Thoroughbred there were many horses introduced into England. Three of these foreign horses exerted an influence so important as to make them worthy special mention.

Byerly Turk.—Captain Byerly's charger at the battle of the Boyne, during the wars of William in Ireland, attracted such favorable comment that he was subsequently placed in the stud and became famous as a sire of speed, his descendants being represented by Herod. He became known as Byerly Turk, is said to be of pure Arabian descent, and was probably brought to England in 1689.

Darley Arabian.—Mr. Darley, a merchant at Aleppo, Syria, sent an Arabian horse, as a gift, to his brother, Mr. John B. Darley of Aldby Park, near York. This horse, a pure Arab, was bay in color with a blaze on the face and white on three feet, and stood about 15 hands high. He was known as Darley Arabian, and became a very famous sire, his descendants being represented by Flying Childers and Eclipse, the greatest racers of their day. Darley Arabian was brought to England about 1706.

Godolphin Barb.—The Emperor of Morocco presented to Louis XIV. an Arab (or a Barb) stallion, which was so little valued by the French ruler that he was placed in the

shafts of a Paris water cart and cruelly overworked, but is said to have been watched over closely by a faithful attendant until rescued and brought to England by Mr. Coke, where later he became the property of Lord Godolphin, and became known as Godolphin Bard (or Arabian). He was placed in the stud, where he became a very famous sire, his descendants being represented by Matchem. He was probably brought to England about 1728.

From these three Oriental stallions, and their descendants, are derived the best blood of the Thoroughbred. There are few running horses of eminence which could not directly trace their descent from one or more of these famous sires.

Three famous English sires.—While many English-bred horses were prominent in the development of the Thoroughbred, three stand out as really famous in the production of the modern running horse.

Herod (King Herod).—This horse was born in 1758, and was bred by William, Duke of Cumberland. He was sired by Tartar and was out of Cypron. He begun his racing career in October, 1763, when he was five years old, and ended it in May, 1767, when he was placed in the stud. While only moderately successful on the race course, he was a sire of great renown, siring 497 prize winners, and it is estimated that they won for their owners £201,505, or over $1,000,000.

Eclipse.—This horse was born in 1764, during an eclipse of the sun, and was bred by the Duke of Cumberland, at whose sale he brought 75 guineas. He was sired by Marske, and was out of Spiletta. In 1769, D. O'Kelly bought him for 1,650 guineas ($8,250). He begun his racing career at Epsom, May, 1769, at the age of five years, and ended it at Newmarket, October, 1770. He was never beaten, and was retired from the race course because no one would race against him. In 1779 one of the Bedford family asked O'Kelly to place a price on Eclipse and

received the reply that "all Bedford Level wo[illegible] purchase him." At another time O'Kelly was offered $125,000 and an annuity of $2,500 for life. Eclipse won eleven King's Plates, and O'Kelly cleared £25,000 on him.

At the close of his racing career, Eclipse was placed in the stud, where he was equally as successful as on the race course. He sired 334 winners that won for their owners £160,000. He died in 1789 at the age of 25 years. In historical description this noted horse is said to have been about 15.1 hands high; his shoulders were low, oblique and thick above, while he stood high behind. He possessed a powerful loin, very long quarters as well as powerful and long thighs and forearms. His stride was very wide, and he was so thick winded that he could be heard some distance. John Lawrence said of him that "he puffed and blowed like an otter and galloped as wide as a barn door." While Eclipse is described as being of fine disposition, in a race he took his own gait, rushing along with his head down, indifferent of his rider, who found it impossible to control him.

Matchem.—This horse was born in 1748, and was bred by Sir John Holmes of Carlisle. He was sired by Cade and was out of Sister to Miss Patten. He begun his racing career August, 1753, as a five-year-old, and ended it September, 1758, when he was placed in the stud. He was only moderately successful as a racer, but very famous as a sire, due to his superior blood and conformation. His best-known son, also called Matchem, became a great racer and a successful sire. It is stated that he made a record of 1.44 for the mile on the Beacon course. Matchem sired 354 sons and daughters that were the winners of races. Matchem died in 1781 at the age of 33 years.

Improvement of the Thoroughbred.—For nearly three centuries Thoroughbreds have been bred under a most rigid system of selection, performance on the race course being the standard. The high degree of perfection

ıed by the best individuals, as well as the prominence which the breed has attained, can be attributed, in part at least, to the fact that the destiny of the breed has been cast with men who have unlimited resources on which to draw.

During the past century important changes have occurred in the system under which Thoroughbreds are

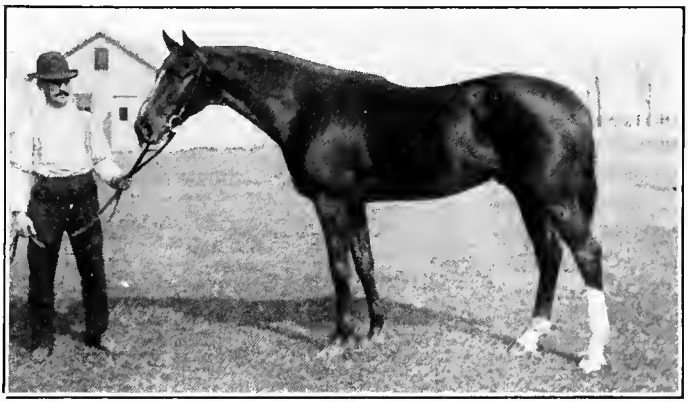


FIG. 61.—THOROUGHBRED STALLION "HERMIS"

raced, which have resulted in corresponding modifications in type. Formerly the horse was not raced until mature and the distance covered was two, three, four and five miles, while at the present time the custom is to run dashes of a mile, or less, to carry less weight, and to start as two-year-olds. Some persons doubt the wisdom of the present methods and contend that the stamina and weight-carrying ability are not improved by the modern method of racing. Further, conflicting opinions are expressed with regard to the probability of modern horses being capable of lowering the long-distance records of a century ago. Comparison is difficult; formerly the races were few and the horses specially trained, while at

present they are kept in racing condition for nine months each year and running many races.

Notable Thoroughbred horses.—During the development of the breed the names of many famous Thoroughbreds have appeared. The following are worthy representatives, all of them famous racers and many of them successful breeders. For convenience of study they are arranged in tabular form, giving date of birth and the sire and dam.

BRITISH THOROUGHBREDS

Animal	Date of birth	Sire	Dam
Squirt	1732	Bartlett's Childers	Snake Mare
Pot-8-os	1773	Eclipse	Sportsmistress
Woodpecker	1773	Herod	Misfortune
Highflyer	1774	Herod	Rachael
Sir Peter	1784	Highflyer	Papillon
Waxy	1790	Pot-8-os	Maria
Whalebone	1807	Waxy	Penelope
Tramp	1810	Dick Andrews	Gohanna
Whisker	1812	Waxy	Penelope
Sir Hercules	1826	Whalebone	Peri
Touchstone	1831	Camel	Banter
Irish Bird Catcher	1833	Sir Hercules	Guiccioli
Gladiator	1833	Partisan	Pauline
Faugh-a-Ballagh	1841	Sir Hercules	Guiccioli
Orlando	1841	Touchstone	Vulture
The Baron	1842	Irish Bird Catcher	Echinda
Stockwell	1849	The Baron	Pocahontas
Kingston	1849	Venison	Queen Anne
King Tom	1851	Harkaway	Pocahontas
Blair Athol	1861	Stockwell	Blink Bonny
Hermit	1864	Newminster	Seclusion
Robert the Devil	1877	Bertram	Cast Off
Bend Or	1878	Doncaster	Rouge Rose
St. Simon	1881	Galopin	St. Angela
Isinglass	1890	Isonomy	Deadlock
Persimmon	1893	St. Simon	Perdita II
Flying Fox	1896	Ormc	Vampire
Diamond Jubilee	1897	St. Simon	Perdita II
Rock Sand	1900	Sainfoin	Roguebrune
Spearmint	1903	Carline	Maid of the Mist
Lemberg	1907	Cyllene	Cadicia

THOROUGHBREDS IMPORTED TO AMERICA

Animal	Date of birth	Sire	Dam
Matchem	1754	Godolphin Bard	Soreheels Mare
Stark	1771	Marsk	Snap Mare
Diomed	1777	Florizel	Spectator Mare
Messenger	1780	Mambrino	D. of Turf
Saltram	1780	Eclipse	Virago
Highflyer	1784	Highflyer	Thistle
Buzzard	1787	Woodpecker	Misfortune
Olderman	1787	Pot-8-os	Lady of Bolingbroke
Sarpendon	1828	Emilius	Icaria
Glencoe	1831	Sultan	Trampoline
Leamington	1853	Faugh-a-Ballagh	D. of b. m.
Bonnie Scotland	1853	Iago	Queen Mary
Australian	1858	W. Australian	Emilia
Phaeton	1865	King Tom	Merry Sunshine
Prince Charlie	1869	Blair Athol	Eastern Princess
Rayon d'Or	1876	Flageolet	Auracaria
St. Blaise	1880	Hermit	Fusee
Ormonde	1884	Bend Or	Lily Agnes
Sysonby	1901	Melton	Optime

AMERICAN THOROUGHBREDS

Animal	Date of birth	Sire	Dam
Sir Archy	1805	Diomed	Castinanira
Am. Eclipse	1814	Duroc	Miller's Damsel
Boston	1833	Timoleon	S. of Tuckahoe
Lexington	1850	Boston	Alice Carneal
Norfolk	1860	Lexington	Novice
Emperor	1860	Leamington	
Longfellow	1867	Leamington	Nantura
Enquirer	1867	Leamington	Lida
Tom O'Chiltree	1872	Lexington	Katona
Parole	1874	Leamington	Maiden
Himyar	1875	Alarm	Hira
Spendthrift	1876	Australian	Aerolite
Lake Blackburn	1877	Bonnie Scotland	Nevada
Foxhall	1878	King Alfonso	Jamaica
Iroquois	1878	Leamington	Maggie B. B.
The Bard	1883	Longfellow	Brademante
Firenzi	1884	Glenelg	Florida
Hanover	1884	Hindoo	Bourbon Belle
Emperor of Norfolk	1885	Norfolk	Marian
Salvator	1886	Prince Charlie	Salina
Hamburg	1891	Hanover	Lady Reel
Nealon	1903	Sain	Sister Josephine
Ballot	1904	Voter	Cerito
Alambalo	1906	Ormes	Blue and White

Famous mares.—In a discussion of notable Thoroughbreds there are at least two mares that deserve special mention, especially because of their longevity and fer-

FIG. 62.—THOROUGHBRED MARE "BLUE GIRL"

tility. Old Fanny Cook produced 15 foals, giving birth to twins at 22 years of age, while Pocahontas also produced 15 foals and lived to the old age of 33 years.

Record prices paid for Thoroughbreds.—While the purchase price of this breed varies widely, yet it is interesting to note some of the very remarkable prices paid during recent years. In 1913, the French turfman Edmund Blanc paid W. R. Wynham $200,000 for the English Thoroughbred stallion White Knight. In 1904 the Duke of Westminster sold Flying Fox for 37,500 guineas ($196,875), and he was taken to France and placed in the stud. In 1905 King Edward VII. sold Diamond Jubilee for $150,000 to Senor Ignacio Correas of Argentine, South America. Ormonde, Jardy, Rocksand and Cyellene also sold for $150,000 each. In all, 20 Thoroughbreds have sold for over $100,000.

The Thoroughbred horse in America.—It was not long after the colonization of our eastern territory before there was established an American turf with its Thoroughbred studs. This was natural, since our southern provinces were settled by the English. There are fragmentary accounts of regular race meetings as early as 1665, and no doubt others preceded these as the early settlers were a horse-racing people. In 1677 the court records of Henrico, Virginia, mentions three racing tests. In the first, the stake was 300 pounds of tobacco; in the second, the winner to take both horses; and in the third, no stake was mentioned. The first racing organization of which we have record was formed in 1760 at Charleston, South Carolina. This organization established the Newmarket course on which were held many enthusiastic races. Virginia, North Carolina and Maryland were the colonies most interested in these early sports.

The first Thoroughbred of which we have record was the horse Bulle Rock, imported to Virginia in 1730 by Patton and Gist. Other importations followed (p. 95). One of the most notable horses ever introduced to this

country was Diomed, winner of the first English Derby. He was imported in 1799 in his twenty-second year of age, and is regarded by many as the real progenitor of the American Thoroughbred. In direct line of descent from him comes Sir Archy, often referred to as the first truly American Thoroughbred, while Boston, Sir Archy's grandson, is conceded to have been the greatest American race horse. Boston sired Lexington, a scarcely less remarkable racer than Boston, and a most influential sire, especially through the female line. Lexington's blood enters into the American saddle horse and the Standardbred as well as of the Thoroughbred.

From the original seat in the southern colonies the Thoroughbred sentiment moved north, centering about the Union course on Long Island, then westward into Kentucky and Tennessee. The environment of Kentucky proved so congenial to the horses bred there that the state soon attained first position as a Thoroughbred horse-producing state. Later some of the best blood of the breed found its way to California and studs were founded which have achieved national fame.

Description of the Thoroughbred horse.—The conformation of the running horse is distinctive. He is upstanding, long, lithe, rangy and angular, thus favoring speed, and is in striking contrast to the low, broad, compact and massive form significant of power in the draft horse. There is a general spareness, particularly about the head and legs, and the muscles and tendons stand out prominent and cordy.

The head is moderately small, with sharply defined features, showing breeding; nostrils large and full; eyes clear, prominent and intelligent; ears neat, of medium size, not too wide apart and carried in a lively manner. The neck should be long, the upper part from the poll to the withers about twice as long as the lower part from the point of the shoulders to the larynx, and strongly muscled. The shoulders should slope obliquely back,

forming high, fairly close, but long withers. The chest is often rather narrow and lung capacity is obtained by great depth which, in connection with the high withers, gives the body a deep appearance.

The back should be fairly broad, level and muscular, with well-sprung ribs of great depth, thus giving digestive capacity. The loins should be broad and muscular. The croup tends to length and a bit straight, but should be well muscled. The tail should be attached medium high and carried gracefully. The quarters should be long, deep and strongly muscled, thus giving great driving power. The legs above the knees and hocks should be long and well muscled. The knees and hocks should be strong and clean. The cannons should be deep and clean with tendons well detached. The fetlocks should be strong and clean. The pasterns should be long and sloping, as well as strong and clean. The feet should be of medium size, with the hoof dense and elastic. A fine, smooth coat of hair and a soft delicate skin, with the superficial blood vessels well marked, complete a general appearance of quality and refinement.

In height, the Thoroughbred ranges from 14.2 to 16.2 hands, though 15 to 15.2 hands is most approved. It is interesting to note that the breed has increased in height during its development, the statement being made that the average height has increased from 14 hands in 1700 to 15 hands 2½ inches in 1900. The weight is likewise extremely variable, but in general ranges from 900 to 1,050 pounds, though many excellent individuals exceed this many pounds. The prevailing colors are bay, brown and chestnut, with one or more white markings, though black, gray, sorrel, roan and, in fact, all colors are occasionally found. In temperament, the Thoroughbred is nervous and often mettlesome because of his racing spirit.

Famous race meetings.—The three noted race meetings in England are the Derby, the St. Leger and the Oaks,

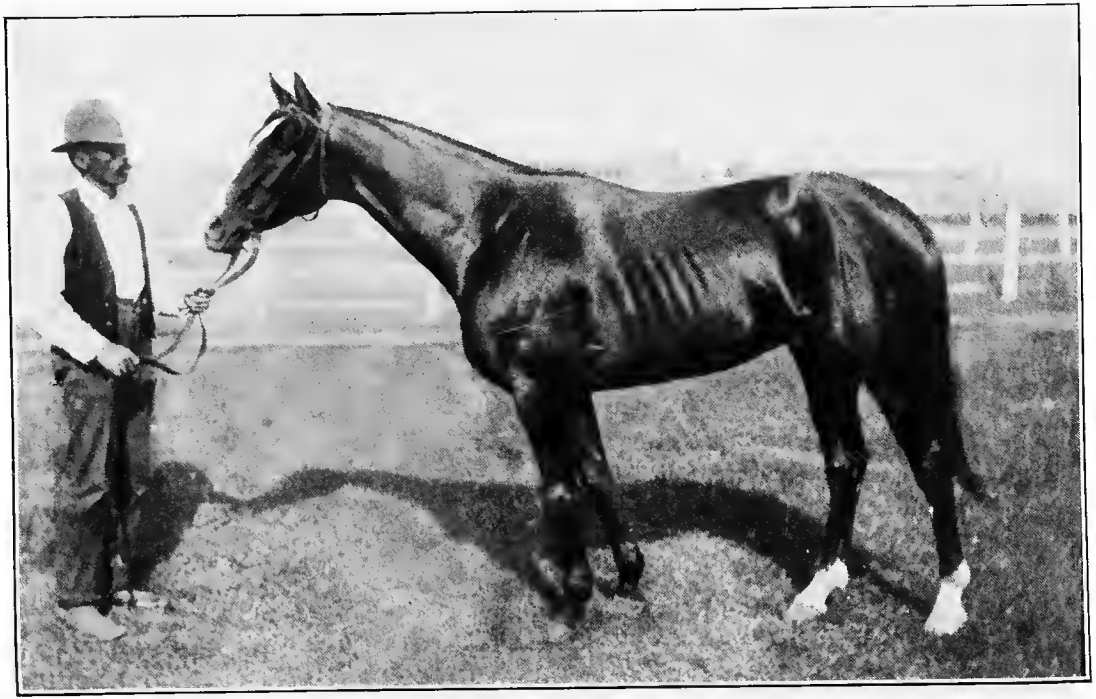


FIG. 63.—THOROUGHBRD STALLION "JEAN BEREAUD"

each of which are very old. The first Derby in England was run at Epsom, May 4, 1780, for a stake valued at 50 guineas, open to three-year-old colts, the colts to carry eight stones, fillies seven stones and eleven pounds, over a distance of one mile. This was won by Diomed. In 1784 the distance was increased from one mile to one and one-half miles. The only American-bred horse to win the Derby was Iroquois, a descendant of Diomed. He also won the St. Leger, a notable feat in view of the fact that both the Derby and the St. Leger have been won by the same horse but nine times in over a century of racing.

There are a number of important events held in America, the following being the most notable: Metropolitan Handicap, one mile, Belmont Park; Carter Handicap, seven furlongs, Aqueduct; Excelsior Handicap, one and one-sixteenth miles, Jamaica; Saratoga Handicap, one and one-quarter miles, Saratoga; Suburban Handicap, one and one-fourth miles, Sheepshead Bay; Brighton Handicap, one and one-fourth miles, Brighton Beach; the Futurity, six furlongs, Sheepshead Bay; and the Brooklyn Handicap, one and one-fourth miles, Gravesend.

Speed records of the Thoroughbred.—With this breed races are run under the saddle and a right skillful rider (jockey) is needed. Jockeys usually weigh from 100 to 125 pounds. The fastest record, 1.35½, was made by Salvator on a straightaway track of one mile, in 1890, at Monmouth Park, New Jersey. The best record for a standard track is 1.37⅕, made December 22, 1908, by Center Shot, on the Santa Anita track, while the next best record is 1.37⅖, which has been equaled many times. In 1855 Lexington ran four miles in 7.19¾, winning $20,000 in a race against time. In 1897 Lucrezia Borgia ran four miles against time on the Oakland track in 7.11, while in 1911 Messenger Boy ran the same distance on the Louisville track in 7.14⅕ in a race.

English records.—The following table gives the English Derby race records, one and one-half miles, since

1900, showing the name of the winner, his sire and the time:

ENGLISH RECORDS

Year	Name of winner	Sire	Time
1900	Diamond Jubilee	St. Simon	2.42
1901	Volodyovski	Florizel	2.40⅘
1902	Ard Patrick	St. Florian	2.42¼
1903	Rock Sand	Sainfoin	2.42⅘
1904	St. Amant	Frusquin	2.45⅘
1905	Cicero	Cyllene	2.39⅘
1906	Spearmint	Carbine	2.36⅘
1907	Orby	Orme	2.44
1908	Signorinetta	Chaleureux	2.39⅘
1909	Minorn	Cyllene	2.42⅘
1910	Temberg	Cyllene	2.35⅕
1911	Sunstar	Sunbridge	2.36⅘

American records.—The following table gives the Suburban Handicap races of one and one-fourth miles, run at Sheepshead Bay, giving the name of the winner, weight of jockey, time and money won:

AMERICAN RECORDS

Year	Name of winner	Weight of jockey	Time	Purse
1900	Kinley Mack	125 pounds	2.06⅘	$ 6,800
1901	Alcedo	112 pounds	2.09⅘	7,800
1902	Gold Heels	124 pounds	2.05¼	7,800
1903	Africander	110 pounds	2.10⅖	16,490
1904	Hermis	127 pounds	2.05	17,000
1905	Beldame	123 pounds	2.05⅖	16,800
1906	Go-Between	124 pounds	2.05¾	16,800
1907	Nealon	124 pounds	2.06⅖	16,800
1908	Ballot	126 pounds	2.03	19,750
1909	Fitz Herbert	122 pounds	2.03⅘	3,850
1910	Olambala	122 pounds	2.04⅘	6,000

Reduction in records.—The following table gives the reduction in time for American races over a mile track, beginning in the early fifties. The table shows the name of the horse, the year, place and the time of the heat.

AMERICAN RUNNING RECORDS REDUCED-MILE TRACK

Year	Name of horse	Race course	Time
1854	Charley Bell	Lexington	1.45¾
1859	Satallite	Lexington	1.45¼
1862	Mammona	Lexington	1.44¼
1866	Revolver	Cincinnati	1.44
1869	Hertog	Cincinnati	1.43½
1872	Alarm	Saratoga	1.42¾
1874	Gray Planet	Saratoga	1.42¼
1875	Searcher	Lexington	1.41¾
1877	Ten Broeck	Hartford	1.39¾
1890	Racine	Washington Park	1.39½
1893	Chorister	Morris Park	1.39¼
1894	Libertine	Harlem	1.38¾
1900	Voter	Brighton Beach	1.38
1903	Allan-A-Dale	Washington Park	1.37½
1903	Dick Wells	Harlem	1.37¾
1908	Center Shot	Santa Anita	1.37½

A notable sire of winning stock.—Each year a record is made of the sire whose descendants win the most races. Of the number thus far recorded Lexington is the most notable. During 22 seasons he sired 600 horses, of which 236 were winners of races and in 15 years they won a total of $1,159,320 for their owners.

Popularity of the Thoroughbred horse.—This breed has found its way into all countries where race horses are popular. This is especially true of Great Britain, United States, France, Germany, Australia and Argentine Republic.

Thoroughbred blood has been much used in the development of other breeds of horses. Each of the draft breeds owes much of its quality to Thoroughbred crosses. The Hackney descended from a Thoroughbred cross on the common mares of Norfolk. In like manner the French Coach, German Coach and the Yorkshire Coach have been produced. The Thoroughbred, Imported Messenger, is considered the foundation sire of the Standardbred, while Denmark, a son of Imported Hedgeford, is now accorded the only foundation sire in the American saddle horse. Furthermore, the Thoroughbred is very popular in the production of the hunter, jumper, polo pony, and the like.

Organizations and records.—As it was to preserve the purity of the Thoroughbred that books of record were established, their early development is worthy mention in this connection. So far as is known there were no records of performance or breeding previous to the

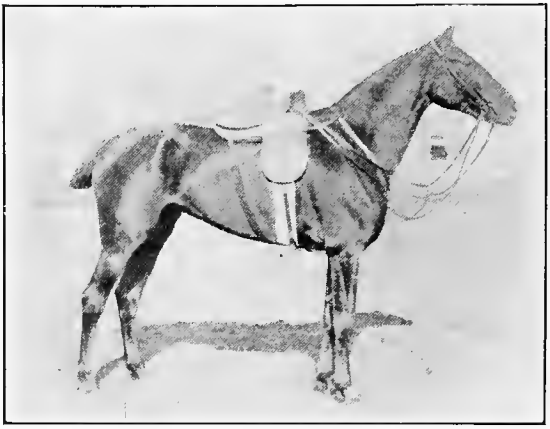


FIG. 64.—THOROUGHBRED ENGLISH HUNTER MARE "ISENLL"

eighteenth century. Thus, through advertisements, sales papers, catalogs, and the like, many fictitious pedigrees, all shaped on fashionable lines, gained currency. This was the condition in England up to 1709 when the first racing calendar was published. Other calendars followed, perhaps the most notable being the Racing Register, published by Bailey Brothers. These records were intended for the convenience of men who wagered money, and who cared nothing for blood lines, hence, mistakes were of frequent occurrence. Such was the condition of pedigrees when, toward the close of the eighteenth century, Weatherby and Pick started their stud books.

In 1786 William Pick of York, England, published "A Careful Collection of All the Pedigrees Possible to Obtain," while in 1791 Weatherby published an

"Introduction to a General Stud Book." These publications were the forerunners of Pick's Turf Register, and of Weatherby's General Stud Book. Though the first volume of both the Register and the Stud Book appeared in 1803, there was great rivalry among the authors. Four volumes of Pick's Turf Register appeared and then the publication was discontinued, while the General Stud Book continued as the official organ of the Thoroughbred in England. This represents the first successful attempt to record the genealogy of animals. The first publication of performance occurred in 1829. In America the Thoroughbreds are registered in the American Stud Book for Thoroughbreds, the official organization being the American Jockey Club.

CHAPTER IX

THE AMERICAN SADDLE HORSE

Like many of the breeds of horses, the American Saddle horse takes its name from the purpose for which it is produced. This breed, although of recent origin, provides greater comfort for the rider than that of any other breed.

Origin of the American Saddle horse.—This breed is of American origin, and is the outgrowth of necessity. In the early days before improved roads or railroads were established, traffic was largely by horseback, along the trails, through the forests, over unbroken and almost impassable roads. Such conditions demanded a sure-footed, sturdy horse that could travel long distances at a steady rate of speed. Out of this need grew the American Saddle horse, rather undeveloped and hard gaited at first, but by the use of better sires, largely Thoroughbreds, there has evolved a horse of magnificent type, capable of going a number of easy and steady gaits.

The breed was developed largely in Virginia, Kentucky, Tennessee and Missouri, though Canadian horses were used to some extent. So much of the development has taken place in Kentucky that the breed is sometimes referred to as the "Kentucky Saddle horse." To improve the gait, easy-going mares were selected and bred to Thoroughbred stallions of easy movement. This cross resulted in a smooth, easy-gaited offspring, whose gait was still further improved by mating with pacing and ambling stallions from Canada and New England.

Influence of the Thoroughbred in developing the American Saddle horse.—Of the 1,081 horses registered in Volume I (first edition) of the American Saddle Horse Stud Book, J. H. Ward found that 879 contained Thoroughbred blood, as follows:

Pure Thoroughbred blood	2 horses
50 per cent. Thoroughbred blood	50 horses
25 per cent. Thoroughbred blood	296 horses
12½ per cent. Thoroughbred blood	343 horses
6¼ per cent. Thoroughbred blood	152 horses
3 per cent. Thoroughbred blood	36 horses
Total containing Thoroughbred blood	879 horses
Uncertain blood	202 horses
Total in Volume I (first edition)	1,081 horses

Denmark F. S. (foundation stock).—In 1891, when the saddle horse breeders organized their association, they arranged a list of 14 sires, which were known as foundation stock. After having revised the list many times, the association, at the annual meeting in 1908, decided to recognize Denmark, by Imp. Hedgeford, alone as foundation. This position would seem justified since of the 2,981 horses registered in Volume I (revised edition), 1,653, or practically 55½%, have direct male trace to Denmark F. S.; in Volume II, of 2,999 entries, 2,378, or practically 79.3%, have direct male trace; while in Volume III, of 2,997 entries, 1,998, or 66⅔%, have direct male trace to Denmark F. S. In the total of 8,979 entries in the three volumes, 6,029, or a little over 67%, have direct male trace to the foundation sire.

Denmark F. S. was bred by Samuel Davenport of Kentucky, and was born in 1839. His sire, Imp. Hedgeford, was a Thoroughbred, and his dam, Betsey Harrison, was a Kentucky bred mare. Denmark F. S. was brown in color, and an individual of much beauty. He was a game and consistent four-mile race horse. Imp. Hedgeford was a brown horse, born in 1825, bred by Mytton and imported to Kentucky in 1832 by William Jackson. Betsey Harrison was a bay mare, born in 1824, bred by Davenport of Kentucky. She was by Aratus out of Jenny Cockracy by Old Patomic.

Denmark's descendants.—The most noted son of Denmark F. S. was Gaines's Denmark, often referred to as

"The Denmark of the Denmark family." This horse was bred by William V. Cromwell of Fayette county, Kentucky, and was born in 1851. His dam was the Stevenson mare by Cockspur. Of the 6,029 entries having direct male trace to Denmark F. S., in the first three volumes of the Register, 6,014, practically a perfect percentage, trace through Gaines's Denmark. This horse was black, with both ankles white, and is described as a horse of wonderful finish and beauty. Gaines's Denmark's most notable sons are Washington Denmark 64, Diamond Denmark 68, Star Denmark 71, and Sumpter Denmark 65. Washington Denmark was bred by William V. Cromwell, and was born in 1855. His dam was Polly Hopkins 46, by Cockspur Horse, a son of Cockspur, which got the dam of his illustrious sire. Diamond Denmark was also bred by William V. Cromwell, and was born in 1858. His dam was Queen 48, by Bald Stockings. Of the 6,014 entries having direct male trace to Gaines's Denmark, Washington Denmark is responsible for 4,518, or a little over 75%, while Diamond Denmark has 903, or about 15%.

FIG. 65.—AMERICAN SADDLE MARE "CAROLINA"—MAJOR J. B. CASTLEMAN

Washington Denmark's most notable sons are King

William 67, Cromwell 73, Stonewall Jackson 72, Jewel Denmark 70, Fayette Denmark 60 and Latham's Denmark 69; also the unregistered stallion Crigler's Denmark, the sire of Rex Denmark 840, who in turn sired the magnificent saddle horse Rex McDonald 1833. Queen 48, the dam of Diamond Denmark, was also the dam of three of the great sons of Washington Denmark, namely: King William, Latham's Denmark and Jewel Denmark. This mare was owned by William V. Cromwell, and through her sons is one of the really great dams of the breed.

FIG. 66.—AMERICAN SADDLE HORSE "KENTUCKY CHOICE"

The greatest son of Diamond Denmark was Montrose 106. He was a bay stallion, bred by Talbot and Thomas of Bourbon county, Kentucky, and was born in 1869. His dam was a Thoroughbred daughter of Hall's Glencoe.

Famous American Saddlers.—More recent notable Saddle horses in direct line of descent from Denmark F. S. are: Black Eagle 74 and Artist 75, both by King William; Black Squirrel 58, by Black Eagle; Highland Denmark 730, Forest Squirrel 801, Red Squirrel 53, Black Squirrel, Jr., 2d, 395, and Patsy McCord 1600, by Black Squirrel; Goodwin 1227, Cupid 1152, and Highland Maid 1270, by Highland Denmark; Amelia 1354, by Red Eagle 28, by Red Squirrel; Rowena 1362, by Chester Dare 10, by Black Squirrel; Monte Cristo 59, by Montrose; and Miss Rex 820, by Red Denmark.

Description of the American Saddle horse.—The Sad-

dler shows much style in the carriage of head and arch of neck and tail. His courage and spirit, coupled with his docility, give him his special usefulness under the saddle as well as in the harness. The ideal Saddler may be described thus: The head is clean cut, rather small, with

FIG. 67.—AMERICAN SADDLE MARE "EDNA MAY"

a very slight dish in the face; the eyes prominent, full, and set wide apart; and the ears small, wide apart and active. The neck is long and gracefully crested with head neatly attached at a good angle. The shoulders are long and sloping with neat withers. The sloping shoulders in connection with the well-sprung ribs give a rather short and very strong back. The loin is well muscled and powerful. The rump is level and strong, with the tail coming out well up, carried high, and is heavy, long and flowing. The quarters are long and strongly muscled. The forearms are well muscled and long, giving distance from withers to knees, while the hind legs from stifles to hocks are also long, thus giving distance from hips to hocks. The knees and hocks are

strong and clean, and the cannons rather short, but with clean, strong bone and well-detached tendons. The pasterns are a little long and sloping. The feet are of medium size, hoofs elastic and the heels well spread and well developed.

In weight the Saddle horse is rather variable, though on the average they run from 950 to 1,050 pounds. The standard height is 15 hands 1½ inches to 15 hands 2½ inches, though as with weight, height is also exceedingly variable. The solid colors, such as bays, blacks, browns and chestnuts, predominate, though all colors are occasionally found.

FIG. 68.—AMERICAN SADDLE HORSE "KENTUCKY COLONEL"

Classes of Saddle Horses.—There are three classes of Saddle horses: The walking horse; the walk, trot and canter horse; and the five-gaited or true American Saddle horse, to which may be added others, as the hunter, high school horse, cavalry horse, polo pony, and the like. The walking horse is well schooled at the running-walk gait. The walk, trot and canter horse is well educated at the three gaits, while the true-gaited Saddle horse is required to go five gaits. He must be able to walk, trot, rack and canter, and for the fifth he may choose any one of the three slow gaits, the running-walk, fox-trot or slow-pace. The hunter is usually able to go most of the saddle gaits, and in addition is well trained at the jump, while the high school horse, in addition to going all the saddle gaits, is well educated in many fancy steps.

GAITS OF THE SADDLE HORSE

There are three natural gaits—the walk, trot and gallop. The other saddle gaits are artificial ones, being more or less variations of the natural gaits.

The walk.—This may be considered the foundation of all gaits. It is a gait of four flat beats, each foot being planted in regular order. If the right forefoot comes first to the ground, the left hind foot is next planted, then the left forefoot and finally the right hind foot. The horse has never less than two and never more than three feet bearing weight on the ground at the same time.

The trot.—In the common trot, the horse moves from one pair of diagonally disposed legs to the other pair, and the footfalls mark two sharp beats. In the common and long trot there is a short period between each step when all four feet are free from the ground. During the short trot, however, one pair of diagonal feet is on the ground all the time. The trot depends simply upon the united action of a fore leg and a diagonal hind leg, hence the weight is alternately borne by the diagonally disposed legs.

The canter.—When true, this is a gait of three beats. When the weight is received upon the left hind foot it next falls upon the right hindfoot and left forefoot, and then upon the right forefoot. The animal works on his haunches, with his legs well under him. The slower the gait, so long as performed with animation and exactness, the better; about five miles an hour being the most desirable.

The rack.—In this gait, each foot falls upon the ground separately, thus making a four-beat gait, hence the term "single foot," which was formerly used to designate the gait. It is similar to the racing pace, in which the pair of legs on either side move alternately; in fact, the rack seems to be a very fast amble, in which the feet follow each other in very rapid succession, thus making a four-

beat gait instead of a two-beat gait, as in the racing pace.

The running walk.—The name fittingly describes the gait. It is an accelerated walk, the footfalls following each other in rapid succession, hence it is a four-beat gait. At this gait many horses nod their heads in rhythm with

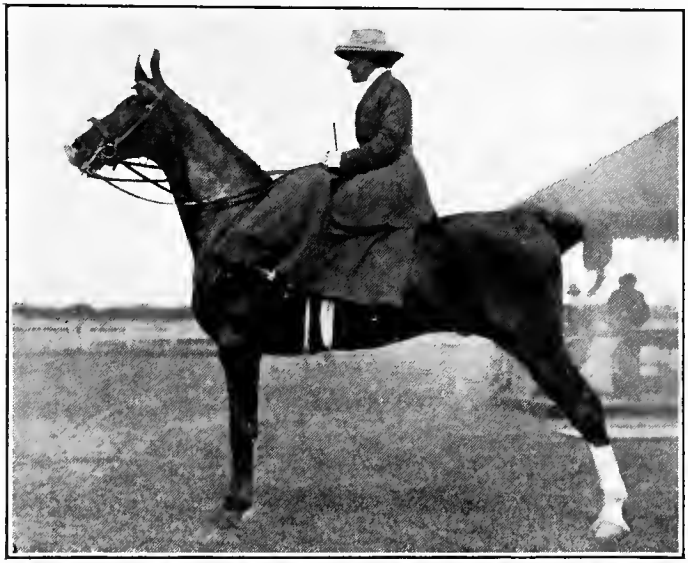


FIG. 69.—GAITED SADDLE HORSE "ROYALIST"

the footfalls, hence the term "nodder," which is sometimes applied to the gait.

The fox trot.—This is a slow, rather loosely jointed trot. It has fittingly been described as a "dog trot." The action is somewhat similar to the trot described above, except that it is much slower and the beats are often separated. The gait is rather difficult to perform.

The slow pace.—Though somewhat similar to the racing pace, this gait differs in that both feet on the same side of the body do not strike the ground at the same

time. There is just enough impact to introduce a short interval, thus making it a four-beat gait. It is difficult for some horses to perform.

Popularity of the American Saddle horse.—Kentucky justly claims to have been the nursery of the American Saddle horse, although the breed is very popular both for business and pleasure throughout the southern states and Canada. Stallions have been sent to Mexico and to South American countries, as well as to England. The American Saddlebred stallion is rather popular for crossing on common mares to improve the gaits, and the general appearance as well as the quality of the offspring of these mares. Further, such crosses are used in the production of the hunter, the army horse, and to some extent in the production of the polo pony.

Organizations and records.—In 1891, the National Saddle Horse Breeders' Association was organized with headquarters at Louisville, Kentucky. In 1899, the name of the society was changed to the American Saddle Horse Breeders' Association. The society established a stud book and published six volumes, registering 6,327 animals. Later the stud book was revised, and thus far five volumes of the revised edition have appeared containing a total of 15,000 entries. The credit for much of this work belongs to Major David Castleman and General John B. Castleman of Kentucky.

CHAPTER X

THE STANDARDBRED HORSE

The Standardbred breed includes both the American trotter and pacer, often erroneously spoken of as separate breeds. They have a common history, and the only distinguishing character between them, if any, depends upon their gait. However, the gaits are interchangeable, and the same horse may pace on one occasion and trot on another.

The origin of the Standardbred horse.—This breed is of American origin, though tracing to animals imported from England, where for many years horses have been trotted and run under the saddle. For more than a century Norfolk and Yorkshire, England, have been noted for their trotting horses. It is stated that in June, 1800, the Norfolk trotting mare Phenomena, at 12 years of age, trotted 17 miles in 56 minutes, carrying a weight in saddle of about 225 pounds on the Huntingdon road. In July of the same year she trotted it in 53 minutes. Further, it is stated that, in 1811, when 23 years of age, she trotted nine miles in 28 minutes. It is also stated that in 1806 the horse Pretender trotted 16 miles in one hour, carrying 210 pounds.

Most important source of Standardbred blood.—The English Thoroughbred furnished much of the improved blood entering into the formation of the American Standardbred horse. The ancestry can be traced in an unbroken line to Darley Arabian, as is illustrated in the chart (p. 120), Darley Arabian siring Flying Childers, who sired Blaze, who in turn sired Sampson and Shales, and so on down the list. Perhaps the most important source was the importation of the stallions Messenger and Bellfounder, whose histories are worthy mention.

Messenger.—In America, this horse is commonly known as Imported Messenger. He was born in 1780 in England, became a successful racer, and as a five-year-old won the King's Plate. He was a gray, 15.3 hands high, with strong loins and powerful hind quarters. Messenger was imported to the United States in May, 1788, and placed in the stud. He was in the stud service for 20 years in America, standing in Pennsylvania, New Jersey and New York. He died January 28, 1808. His most noted son, Mambrino, out of a daughter of Imported Sour Crout, was born in 1806. He was a bright bay, with a star and white ankle, and was 16 hands high. Mambrino's most famous son was Abdallah I., born in 1823, and out of Amazonia. He was a bay horse, about 15.2 hands high, and is described as being rather coarse and lacking symmetry. It is also stated that he was of indifferent disposition, and was not very popular as a sire.

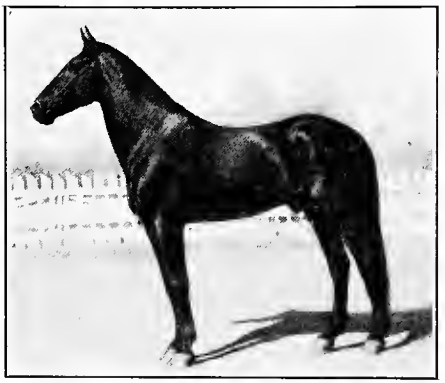


FIG. 70.—STANDARDBRED STALLION "DIRECTUM," 2.05¼

Bellfounder.—In America, this horse is commonly known as Imported Bellfounder, and in England as Jary's Bellfounder 55. He was born in 1815, and imported to the United States in 1822, when taken to Orange county, New York, and placed in stud service. He secured his fame, in the Standardbred foundation, through his daughter, the Charles Kent Mare, the dam of Hambletonian 10, which serves as the connecting link between the English

runners and the Norfolk trotters (see chart, p. 120). Bellfounder was a bright bay with black mane, tail and legs. He stood about 15 hands high and was a natural trotter. It is stated that he was very fleet, trotting 17 miles in an hour. Velocity, his dam, was also a noted trotter, and is said to have trotted 16 miles in an hour on the Norwich road in 1806.

Influence of American horses.—In the early colonial days, most of the traveling was done on horseback, and

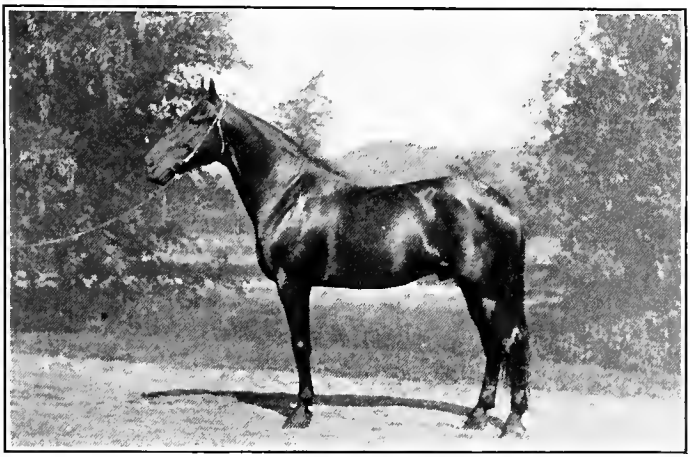
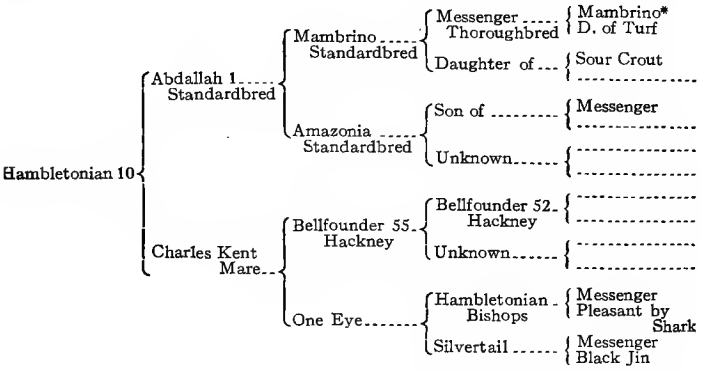


FIG. 71.—STANDARDBRED STALLION "BRETINI," 2.22¼

conditions were favorable to developing horses of hardiness and endurance. Thus we have the Narragansett pacers developed largely in Rhode Island; the Canadian pacers in Canada; the Morgans in Vermont; the Pilots, which were taken to Kentucky, and many other noted strains, all of which played a very important part in the establishment of the Standardbred.

Hambletonian 10.—Perhaps no horse of any breed or period in this or any other country has excited an interest so universal or represented such a vast sum of money in

his offspring and descendants as that of Hambletonian 10, sometimes referred to as Rysdyke's Hambletonian. He was bred by Jonas Seely of Chester, Orange county, New York, born May 15, 1849, sired by Abdallah I., and out of the Charles Kent Mare. When a suckling he was sold with his dam to William M. Rysdyke for $125. Hambletonian 10 was a bay, with star and white ankles. He stood 15.2 hands high and was powerful in build. He stood somewhat higher behind than in front. When three years old he was trained for a time and made a record of 2.48 over the Union course.



*See chart p 120.

Hambletonian 10 began his stud career in 1851 as a two-year-old, and with the exception of one year (1868) he continued in the stud until 1875. During the 23 years' service it is stated that he covered 1,930 mares, getting 1,333 colts, an average of 69% of foals to mares served. It is stated that the total service fee amounted to $207,790.

FAMILIES OF STANDARDBRED HORSES

During the development of the Standardbred breed of horses a number of stallions became very prominent and

their descendants assumed family names. Most of these families are more or less submerged in the breed, but at least one of them stands out so prominent as to be considered a separate breed by some persons.

The Hambletonian family.—This family descended from Hambletonian 10, and at least in number and importance, stands first in the list. This noted stallion sired 40 standard trotters, the most famous, particularly from a breeding point of view, being Electioneer, George Wilkes, Abdallah 15 and Happy Medium.

Electioneer.—This horse is the sire of 160 standard performers, 158 trotters and two pacers. His particular fame is due to his offspring developing speed at an early age. His most noted sons are Sphinx, Chimes and Norval, each with 100 or more standard performers.

George Wilkes.—This horse is the sire of 83 standard performers, 72 trotters and 11 pacers. His great fame is due to the speed-transmitting ability of his sons. At the close of 1912 there were but 10 stallions with 150 or more standard performers, and George Wilkes is the sire of five of them and the grandsire of three others (see chart, p. 120). His greatest sons are Gambetta Wilkes, Onward, Red Wilkes and Alcantara, each the sire of 170 or more standard performers. Red Wilkes is the sire of Ashland Wilkes, a horse with 171 standard performers to his credit, and Jay Bird, another noted son of George Wilkes, is the sire of Allerton, the leading sire of the breed, having 246 standard performers to his credit.

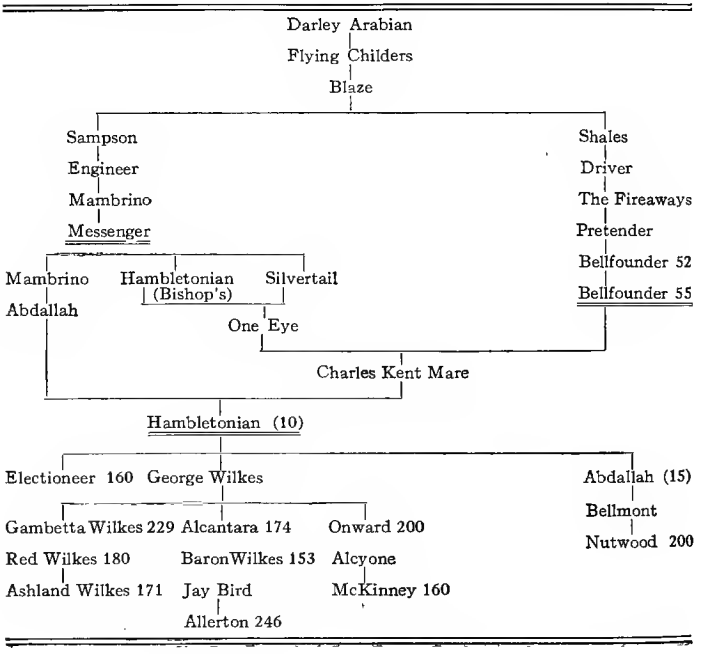
Abdallah 15.—While this horse is the sire of but five standard performers, his son, Belmont, sired Nutwood, the sire of 174 standard performers, 137 trotters and 37 pacers. Nutwood leads all other stallions as sires of producing brood mares. Abdallah also sired Major Edsal, the sire of Robert McGregor, a horse with 112 standard performers, 98 trotters and 13 pacers.

Happy Medium.—This horse sired 99 performers, 88 trotters and 11 pacers. His greatest son, Pilot Medium,

sired 127 standard performers, 103 trotters and 24 pacers. Happy Medium also sired Milton Ned, sire of Sidney Dillon, who sired Lou Dillon, champion trotting mare.

Among other noted sons of Hambletonian 10 are Dictator, with 60 performers in the list; Strathmore, with 89 in the list; Egbert, with 85 in the list; Aberdeen, with 52 in the list, and Harold, with 45 in the list; also the sire of Maud S., 2.08¾, champion trotter 1883-5.

CHART SHOWING DESCENT OF STANDARDBRED FROM DARLEY ARABIAN THROUGH MESSENGER AND BELLFOUNDER; THE RELATION OF THE STANDARDBRED TO THE THOROUGHBRED AND NORFOLK TROTTER; AND THE RELATIONSHIP OF THE TEN STALLIONS WITH 150 OR MORE PERFORMERS, THE FIGURES FOLLOWING THE NAMES INDICATING THE NUMBER OF PERFORMERS:



The Morgan family.—This is one of the oldest trotting families and at the present time is considered by many as a separate breed. The family takes its name from Justin Morgan, said to be by True Briton out of a daughter of Diamond, both sire and dam tracing to Godolphin Barb. The breeding of Justin Morgan has been questioned, and it is stated that little is known of his ancestors. He was born in 1793, at West Springfield, Massachusetts, but was later removed to Vermont, in which state this family of horses has gained fame. He is described as a dark bay, with black points, about 14 hands high and weighing 950 pounds, a fast walker, a good trotter, and very intelligent, being used as a parade horse, and as a short distance runner and a farm work horse.

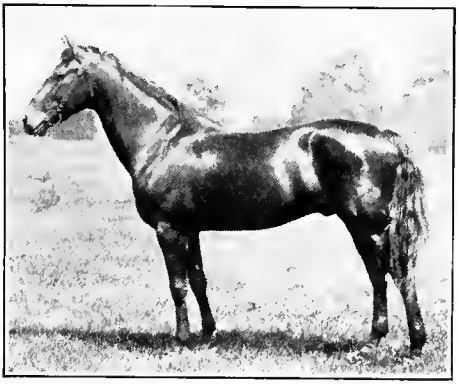


FIG. 72.—STANDARDBRED MORGAN STALLION

Justin Morgan had a long stud career and proved a very prepotent sire, though he did not produce great breeding sons as did Hambletonian 10. The three sons of Justin Morgan that were most prolific as a source of trotters were Sherman Morgan, Woodbury and Bulrush. Sherman Morgan's most noted son, Black Hawk, born in 1833, was a trotter and noted sire. Black Hawk's most noted son, Ethan Allen, born in 1849, also became popular as a successful trotter and famous as a sire. In 1858 he made a record of 2.28, at that time the champion record. He sired 36 producing sons and daughters, the most noted

being Daniel Lambert, himself the sire of 38 trotters. It is of interest to note that the sire of Daniel Lambert's dam was Abdallah I, the sire of Hambletonian 10.

In 1906, the United States government, in co-operation with the Vermont Agricultural Experiment Station, established a stud of Morgans, where experimental work is being conducted with a view of preserving the Morgan type at its best, including conformation, endurance and ruggedness, for which they have been noted. General Gates, the pure Morgan at the head of the stud, is black in color, 14 hands 2½ inches high and weighing about 1,000 pounds. In 1904, the United States government, in co-operation with the Colorado Agricultural Experiment Station, established a stud with the object of evolving a breed of carriage horses from American material. The Standardbred stallion Carmon, a descendant of Justin Morgan, is at the head of the stud. He is beautiful bay in color, 16 hands high and weighs 1,200 pounds.

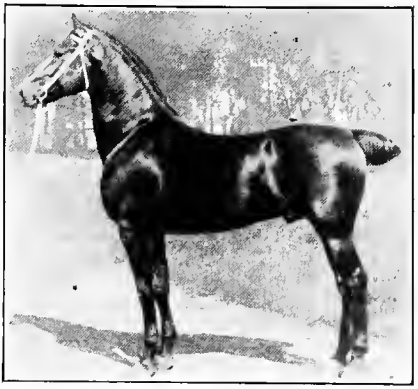


FIG. 73.—STANDARDBRED STALLION "CARMON" At the head of the Ft. Collins stud

The Mambrino family.—This family takes its name from Mambrino Chief, by Mambrino Paymaster, by Mambrino, by Messenger. Mambrino Chief's dam is Untraced. He was born in 1844, a dark brown, standing 16 hands high and said to be rather coarse. He was taken to Kentucky in 1854 and placed in the stud. His noted son, Mambrino Patchen, sired 25 standard trotters, while his daughter Dolly was the dam of Onward, Director and Thorndale, three famous animals. Mambrino King,

by Mambrino Patchen, sired 77 performers and was regarded by many persons as the most beautiful horse of his day. He also sired Elyria, who has 128 standard performers to his credit, 108 trotters and 20 pacers.

The Clay family.—This family is generally considered to start with Henry Clay, hence the name, but it really traces back through the male line to Grand Bshaw, born in 1816, and imported from Tripoli in 1820. Grand Bshaw was bred to Pearl by First Counsel, out of Fancy by Messenger, and from this union resulted Young Bshaw, the sire of Andrew Jackson, the fastest trotter of his day, especially as a two-miler. Andrew Jackson was bred to the trotting mare Lady Surry from which union resulted Henry Clay 8, born in 1837. Henry Clay 8 sired Cassius M. Clay 18, who sired George M. Patchen 2.23½, champion trotting stallion in 1859-60. Cassius M. Clay 18 sired Cassius M. Clay 20, who in turn sired Harry Clay 45, the sire of Green Mountain Maid. This family attains its notoriety most largely through Green Mountain Maid and Beautiful Bells, both of which are of this descent.

The Pilot family.—This family takes its name from Pilot, born in 1828, in the Province of Quebec, near Montreal. Little is known of his breeding except that his dam was Jeanne d'Arc, by Voyager. Pilot was taken to Connecticut when a colt, to New York in 1830, to New Orleans in 1831, and in 1832 he was returned to Kentucky where he died in 1853. He was both a trotter and pacer. His most noted son, Pilot Jr., out of Nancy Polk, by Funk's Havoc, was born in 1844. Pilot Jr. was gray in color, 15.2 hands high and noted as a breeder of brood mares. He sired Miss Russell, Midnight and Waterwitch, to which the family owes its principal fame.

Hal family.—This family takes its name from Tom Hal, a roan horse born in Canada, but afterwards taken to Kentucky. His breeding is not known, but it is stated that he contained Morgan blood. His greatest son, Gibson's Tom Hal, sired Brown Hal, who has 94 standard

performers to his credit, three trotters and 91 pacers, among them Star Pointer, a pacer of speed, character and endurance that reduced the pacing record to 1.59¼.

Three famous Standardbred brood mares.—While the list of notable trotting and pacing brood mares is very long, including many thousand of more or less distinction, yet there are three mares worthy special mention;

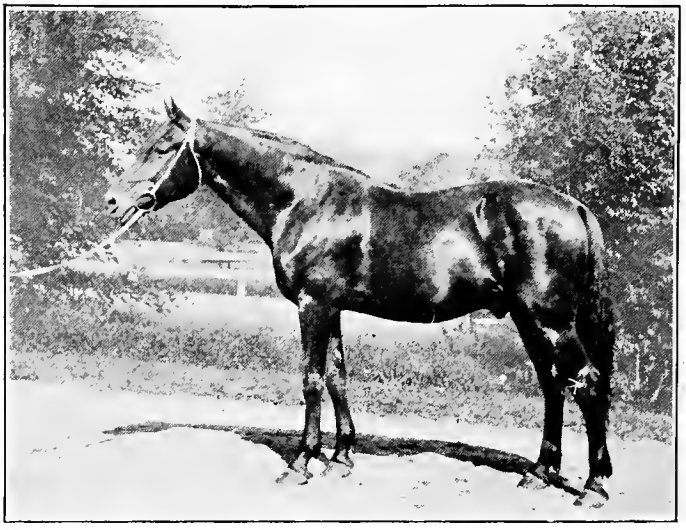


FIG. 74.—STANDARDBRED STALLION "KREMLIN," 2.07¾

namely, Beautiful Bells, Green Mountain Maid and Miss Russell.

Beautiful Bells.—This mare was bred by L. J. Rose of California, and was sired by The Moore, and out of Minnehaha and born in 1872. Early in life she was purchased by Leland Stanford of Palo Alto, who also owned Electioneer. She produced 11 standard trotters and eight producing sires, either by Electioneer or his sons. On her sire's side she was a Clay and on her dam's a Mambrino.

Green Mountain Maid.—This mare was bred by Samuel Conklin of Middletown, New York, and was sired by Harry Clay, and out of Shanghai Mary, and born in 1862. She stood 15 hands high and was brown in color, with star and white hind ankles. She spent the most of her life in the possession of Charles Backman at Stony Ford Farm, dying in 1888, at the age of 26 years. Green Mountain Maid produced 16 foals, 14 of which were sired by Messenger Duroc. Her greatest son was Electioneer, her second foal, and sired by Hambletonian 10. Of the 16 colts, nine were standard trotters. In her memory, the year following her death Backman erected a granite monument with the inscription "On the spot dedicated to her worth and honored by her dust."

Miss Russell.—A gray mare bred by R. A. Alexander, Woodburn, Kentucky, and was sired by Pilot Jr., and out of Sally Russell by Boston. Miss Russell was the dam of 18 foals, seven of them standard performers, five trotters and two pacers. Her first and greatest son was Lutwood, by Belmont, and her most famous daughter was Maud S., by Harold, the champion trotter of her day.

The famous present-day stallions.—As with the dams, the list of famous trotting and pacing sires is a very long one, and it is not possible to consider each. There are, however, three modern sires that seem worthy of special mention, namely, Peter the Great, Bingen and McKinney.

Peter the Great.—This horse was bred by D. D. Streeter, Kalamazoo, Michigan, and was sired by Pilot Medium, and out of Santos, dam of standard performers. He was born in 1895. Peter the Great stands 16 hands high and weighs 1,150 pounds. He has 99 standard performers, 94 trotters and five pacers. While he is now only 16 years of age, he has 13 performers in the 2.10 list. He is the only stallion to win and sire a winner of the Kentucky futurity.

*Bingen.**—This horse was bred by A. Smith McCann, but

*Bingen died April 13, 1913.

was born the property of D. Bennett, Lexington, Kentucky, and was sired by May King, and out of Young Miss, and born in 1893. Bingen is the sire of 133 standard performers, 105 trotters and 28 pacers. In his eighteenth year of age he has 10 performers in the 2.10 list. He is particularly noted as a sire of extreme speed, his famous son, Uhlan, out of Blonde, by Sir Walter Jr., having a record of 1.58, the champion trotter of today.

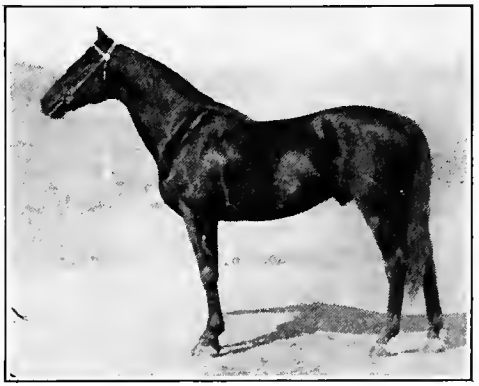


FIG. 75.—STANDARDBRED STALLION "MCKINNEY," 2.11¼

McKinney. — This horse was bred by H. H. Wilson, Cynthiana, Kentucky, and was sired by Alcyone, and out of Rosa Sprague. He was born in 1887. McKinney is the sire of 165 standard performers, 133 trotters and 32 pacers. He is famous as a sire of extreme speed, and at the close of 1911 leads the list of 2.10 performers with a total of 23—13 trotters and 10 pacers.

Famous horses and prices paid.—The highest price ever paid for a Standardbred horse was $125,000, paid by J. M. Forbes of Boston for Arion, 2.07¾, by Electioneer; the next highest price was paid by W. P. Ijams, president of the American Trotting Association, for Axtell, 2.12, by William L., and the amount was $105,000; Bradley of the Ardman Farm at Raritan, New Jersey, paid $50,000 for Bingen, 2.06¼; Simpson of the Empire City Farms, Cuba, New York, paid $50,000 for McKinney, 2.11¼, by Alcyone. Hanna of Cleveland, Ohio, paid $50,000 for Hamburg Belle, which is the highest price ever paid for

a mare. Dan Patch, 1.55¼, the champion pacing horse, was purchased for $60,000 by Savage, who has since refused $180,000 for him.

Description of the Standardbred horse.—There are many pronounced types among Standardbred horses. Perhaps no breed of horses has been produced under more variable conditions, and certainly no recognized breed contains a greater variation in size, color and character than does this light harness breed. Good examples of the two extremes are Lou Dillon and Sweet Marie; the former a speed marvel, slim and graceful, with a high nervous organization, the latter, a great campaigner, stronger framed, fuller muscled, of larger size, and of remarkable strength and endurance.

The head should be of medium size, clean cut and carried high. The neck should be of medium length, muscular and graceful, with a noticeable crest in the stallion. The shoulders should be long and sloping, withers refined and chest low. The back should be fairly level, short and strong, while the underline should be long. The loin and croup should be strong and well muscled, but graceful, with the tail well attached and carried high. The quarters should be long and muscular. The legs above the knees and hocks should be long, lean and muscular, thus giving length from withers to knees, and from hips to hocks. The knees and hocks should be strongly supported and clean cut. The cannons should be short and clean, with tendons well detached, thus giving depth. The pasterns should be clean and slope nicely, while the feet, both fore and hind, should be even in size, moderately large, and of healthy, oily color. The Standardbred horse has a strong, quick and long stride, with clean knee and hock action and trots to better advantage than any other breed.

There is much discussion as to the correct conformation for a pacer, as many of the most famous pacers show a steepness of the croup and curving of hocks, which

appears to be more or less associated with the gait, though many persons state this is not necessarily true.

The height is exceedingly variable, averaging 15 to 16 hands, and good weights are 900 pounds for mares and 1,150 pounds for stallions.

The trotting and pacing standard.—"When an animal

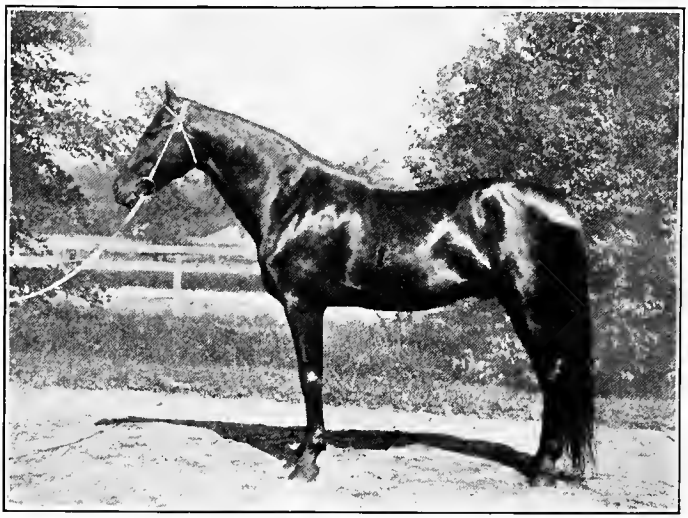


FIG. 76.—STANDARDBRED STALLION "BINGARA"

meets these requirements and is duly registered, it shall be accepted as a Standardbred trotter:

"1. The progeny of a registered standard trotting horse and a registered standard trotting mare.

"2. A stallion sired by a registered standard trotting horse, provided his dam and granddam were sired by registered standard trotting horses, and he himself has a record of 2.30 and is the sire of three trotters with records of 2.30 from different mares.

"3. A mare whose sire is a registered standard trotting horse, and whose dam and granddam were sired by registered trotting horses, provided she herself has a trotting record of 2.30 or is the dam of one trotter with a record of 2.30.

"4. A mare sired by a registered standard trotting horse, provided she is the dam of two trotters with records of 2.30.

"5. A mare sired by a registered standard trotting horse, provided her first, second and third dams are each sired by a registered standard trotting horse."

The pacing standard is similar except the word "pacer" is substituted for the word "trotter;" "pacing" for the word "trotting;" the speed standard 2.25 for 2.30; and the addition of a sixth paragraph, which is as follows:

"6. The progeny of a registered standard trotting horse out of a registered standard pacing mare, or of a registered standard pacing horse out of a registered standard trotting mare."*

Influence of the standard.—Recording performance when making the standard has been a most important factor in developing extreme speed in the trotter and pacer. This method not only distinguishes the slow and fast horses, but from the records the breeder can determine those that are actually producing fast horses. In breeding, the slow ones are discarded and the fast ones are propagated, which, in connection with improved conditions, enables us to get still faster producers. Again the slow ones are discarded and the fast propagated, with the results that the maximum speed of the race has been raised. The following tables show the reduction in time for a mile track with horses in harness between 1810 and 1912. The table gives the name of the horse, place of the race, date and time.

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*Wallace's American Trotting Register, page 4.

Trotting Records Reduced

Date	Name of horse	Place of record	Record
1810	Boston	Philadelphia, Pa.	2.48½
1826	Trouble	Jamaica, N. Y.	2.43½
1834	Sally Miller	Philadelphia, Pa.	2.37
1838	Edwin Forest	Philadelphia, Pa.	2.36½
1839	Dutchman	Hoboken, N. J.	2.32
1845	Lady Suffolk	Hoboken, N. J.	2.29¼
1849	Pelham	Jamaica, N. Y.	2.28
1853	Highland Maid	Jamaica, N. Y.	2.27
1856	Flora Temple	Jamaica, N. Y.	2.24½
1859	Flora Temple	Kalamazoo, Mich.	2.19¾
1867	Dexter	Buffalo, N. Y.	2.17¼
1871	Goldsmith Maid	Milwaukee, Wis.	2.17
1874	Goldsmith Maid	Boston, Mass.	2.14
1878	Rarus	Buffalo, N. Y.	2.13½
1879	St. Julien	Oakland, Cal.	2.12¾
1880	Maud S.	Chicago, Ill.	2.10¾
1884	Jay-Eye-See	Providence, R. I.	2.10
1885	Maud S.	Cleveland, Ohio	2.08¾
1891	Sunol	Stockton, Cal.	2.08¼
1892	Nancy Hanks	Terre Haute, Ind.	2.04
1894	Alix	Galesburg, Ill.	2.03¾
1900	The Abbot	Terre Haute, Ind.	2.03½
1901	Cresceus	Columbus, Ohio	2.02¼
1903	Lou Dillon	Readville, Mass.	2.00
1903	Lou Dillon	Memphis, Tenn.	1.58½*
1912	Uhlan	Memphis, Tenn.	1.58

* Paced by runner to sulky carrying wind or dust shield.

Pacing Records Reduced

Date	Name of horse	Place of record	Record
1839	Dover	Hoboken, N. J.	2.28
1844	Fanny Ellsler	Albany, N. Y.	2.27½
1844	Unknown	Hoboken, N. J.	2.23
1852	Pet	Long Island, N. Y.	2.18½
1855	Pocahontas	Long Island, N. Y.	2.17½
1879	Sleepy George	Rochester, N. Y.	2.15½
1879	Sleepy Tom	Chicago, Ill.	2.12½
1881	Little Brown Jug	Hartford, Conn.	2.11½
1884	Johnston	Chicago, Ill.	2.06¼
1891	Direct	Independence, Iowa	2.06
1892	Hal Pointer	Chicago, Ill.	2.05¼
1892	Mascot	Terre Haute, Ind.	2.04
1894	Robert J.	Terre Haute, Ind.	2.01½
1896	John R. Gentry	Portland, Me.	2.00½
1897	Star Pointer	Readville, Mass.	1.59½
1904	Prince Albert	Empire City, N. Y.	1.57*
1905	Dan Patch	Memphis, Tenn.	1.55¼*

* Paced by runner to sulky carrying wind or dust shield.

Trotting and pacing records.—There are many standard trotting and pacing events, and while the horses at the

top of such events are constantly changing, yet it would seem that the fastest records were worthy special mention. The following tables contain the world's records for the more important events up to January 1, 1913, showing the name of the horse, place, date and record:

Trotting Records

Date	Event	Name of horse	Place	Record
1904	Half mile	Major Delmar	Memphis, Tenn.	.59½
1912	One mile	Uhlan	Memphis, Tenn.	1.58
1909	One mile in race	Hamburg Belle	North Randall, Ohio	2.01¼
1910	Two miles	The Harvester	Lexington, Ky.	4.15¼
1902	Five miles	Zambra	Lexington, Ky.	12.24
1893	Ten miles	Pascal	New York, N. Y.	26.15
1865	Twenty miles	Capt. McGowan	Boston, Mass.	58.25
1846	Fifty miles	Ariel	Albany, N. Y.	3.55.40½
1853	One hundred miles	Conqueror	Centerville, L. I.	8.55.53
1910	Fastest stallion	The Harvester	Columbus, O.	2.10
1912	Fastest gelding	Uhlan	Memphis, Tenn.	1.58
1903	Fastest mare	Lou Dillon	Memphis, Tenn.	1.58½*
1912	Fastest yearling	Airdale	Lexington, Ky.	2.15¼
1909	Fastest two-year-old	Native Belle	Lexington, Ky.	2.07¼
1910	Fastest three-year-old	Colorado E.	Lexington, Ky.	2.04½
1910	Fastest four-year-old	Joan	Lexington, Ky.	2.04¾
1904	To high-wheel sulky	Major Delmar	Memphis, Tenn.	2.07
1911	To wagon	Uhlan	Cleveland, Ohio	2.00
1912	Double team	Uhlan Lewis Forrest	Lexington, Ky.	2.03¼

* Paced by runner to sulky carrying wind or dust shield.

Pacing Records

Date	Event	Name of horse	Place	Record
1903	Half mile	Dan Patch	Memphis, Tenn.	.56*
1905	One mile	Dan Patch	Memphis, Tenn.	1.55¼*
1910	One mile in race	Minor Heir	Indianapolis, Ind.	1.59
1903	Two miles	Dan Patch	Macon, Ga.	4.17
1874	Five miles	Lady St. Clair	San Francisco, Cal.	12.54¾
1905	Fastest stallion	Dan Patch	Memphis, Tenn.	1.55¼*
1903	Fastest gelding	Prince Alert	New York, N. Y.	1.59½*
1903	Fastest mare	Dariel	Memphis, Tenn.	2.00¼
1911	Fastest yearling	Frank Perry	Lexington, Ky.	2.15
1894	Fastest two-year-old	Directly	Galesburg, Ill.	2.07¼
1911	Fastest three-year-old	Miss DeForrest	Lexington, Ky.	2.05¼
1912	Fastest four-year-old	Braden Direct	Lexington, Ky.	2.03¼
1903	To high-wheel sulky	Dan Patch	Macon, Ga.	2.04¾*
1903	To wagon	Dan Patch	Memphis, Tenn.	1.57¼
1912	Double team	Minor Heir George Gano	Columbus, Ohio	2.02

* Paced by runner to sulky carrying wind or dust shield.

Famous drivers of racing horses.—The driver is a very important factor in light harness racing events. To be successful he must possess a keen knowledge of the temperament and capacity of the horse. Among the more famous drivers in America may be mentioned John Splan, Charles Marvin, Budd Doble, E. F. Geers, T. W. Murphy, Alonzo and Alta McDonald, and many others. In 1912 the following sums were won in races by the drivers mentioned: T. W. Murphy, $58,038; W. B. Cox, $51,878; E. F. Geers, $35,169; A. McDonald, $32,841; A. S. Rodney, $32,250; W. F. Snow, $24,851, and W. G. Durfee, $22,730.

FIG. 77.—STANDARDBRED STALLION "CRESCEUS," 2.02¼

Organizations and records.—In 1870 the National Trotting Association was organized, with present headquarters at Hartford, Connecticut, and in 1887 the American Trotters' Association was organized, with headquarters at Chicago, Illinois. The American Trotting Register, published by J. H. Wallace, appeared in 1868. Wallace also established the Year Book, now in its twenty-eighth volume, in which the performance is recorded. In 1891, Wallace sold the Register, Year Book and Monthly Magazine to the American Trotting Register Association, who now publish the Register and Year Book.

The Orloff Trotter.—As the name implies, this is a breed of trotting horses, and is of Russian origin, having

no connection with the American Standardbred, but is discussed in this connection because it is comparatively unknown in America and does not seem worthy an entire chapter.

The origin of the breed dates back to 1777 when, it is stated, Count Alexis Orloff begun the work of developing a new breed of horse to suit the needs of Russia. About 1777 or 1780 Orloff obtained an Arab stallion named Smetanka from the Orient. This horse was said to be silver white in color, very muscular, and to be about 15 hands high. He was used in the stud but a short time when he died, but he sired four stallions and one mare, mostly by Thoroughbred dams. Of these, the most noted was Polkan 1st, who sired seven stallions and 21 mares. Barss or Bars 1st was the most noted son of Polkan 1st. Bars 1st was foaled in 1784, and became a very important factor in founding the Orloff Trotter. He died in 1808.

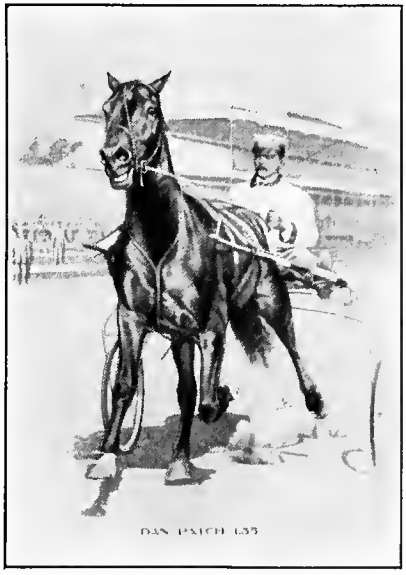

FIG. 78.—STANDARDBRED STALLION "DAN PATCH," 1.55¼

Count Orloff established a large stud, using his stallions on Thoroughbred mares from England. It is stated that he sold no stallions and that he developed two distinct groups, practicing in-breeding on one, but keeping the other group free from in-breeding, by using English

stock. In 1845, when the stud was sold to the Russian government there were 21 stallions and 194 mares of the Orloff group, and nine stallions and 112 mares of the Orloff-Hackney group. The Russians continued to develop the breed, but it is practically unknown outside of Russia.

Description of the Orloff Trotter.—In conformation the Orloff Trotter is heavier set than the American Standardbred, weighing 1,100 to 1,300 pounds, and standing from 15.3 to 16.2 hands high. While these horses are credited with great power and speed, they are not nearly the equal of the American trotter, as the best record known is that made by Wzamakb, 2.27¾, imported by Jacob Heyl. In recent years the breed has been much improved by importing American trotters and crossing with the Orloff. It is stated that the half-bred offspring has shown greater speed as a rule than the sire.

CHAPTER XI

THE HACKNEY COACH HORSE

Among stylish horses, the Hackney coach horse holds first place. The symmetrical form, as well as the very high and free action, are distinguishing features of the breed.

The native home of the Hackney horse.—This breed of horses was developed in eastern and northeastern England, particularly in the counties of Norfolk, Suffolk and York. For many centuries the people of this region have encouraged the production of light active horses suited to saddle work, and succeeded in developing a strong, small trotter.

The origin of the Hackney horse.—In the eleventh century, when the Normans invaded Great Britain, they brought from France the term Haquenee or Hacquenee, which is derived from the Latin Equus, horse, and corresponds to the Danish word nag. The common people applied the word nag to any and every small horse, while the pacing and trotting horse of sufficient quality and substance to be owned by a Norman was spoken of as a Hackney. As early as 1303 this term is said to have come into common use.

There can be no doubt that the native horses of eastern England were much influenced by importations from the Continent, particularly by the Romans, Scandinavians and Norwegians. This mixture gave to the early British horse stock both speed and endurance. There seems to have been much interest taken in breeding trotting horses in Norfolk, as early as 1470, for in that year one of the family of Berney placed on one of his horses an estimated equivalent of $350. . The fact that so much money was asked of a neighbor suggests that there was much interest

taken in the horse, for eight years before, in 1462, Lord Howard, another Norfolk trotter owner, paid an equivalent of $28 for a gray nag to send to the French king.

To encourage improvement in the native horse royal decrees were enacted, the first one dated as early as 1495, during the reign of Henry VII. These laws were intended to promote the breeding of horses fit for the army. Soon other laws were passed to promote horse breeding, the most notable being in 1540 during the reign of Henry VIII. This act was noteworthy, as it provided that all who were able should maintain one or more horses. A few years later followed the first English book on the horse. The book was designated "The Foure Chiefest Offices Belonging to Horsemanship," and was written by Ralph Blunderville, and appeared in 1558.

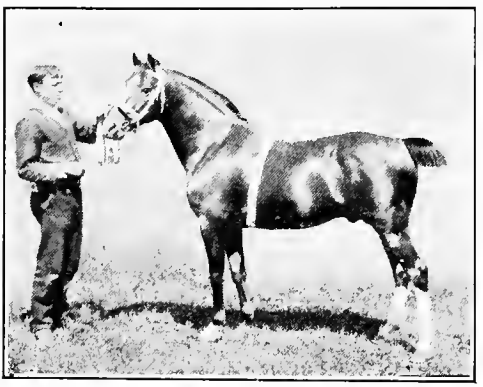

FIG. 79.—HACKNEY STALLION "ENFIELD NIPPER"

Development of the Hackney coach horse.—While much improvement had been accomplished in the road horses of Norfolk and Suffolk, the real development of the Hackney coach horse did not begin until the eighteenth century. During the early part of the century, mention is made of the use of stallions imported from Arabia, Barbary and Turkey and crossing them on the native mares of Norfolk. The Thoroughbred was also used in crossing which, in connection with the Oriental crosses, increased the speed and improved the quality, thus providing ex-

cellent foundation material for the development of the modern Hackney coach horse.

Shales and descendants.—No single horse played so important a part in the development of the Hackney as Shales (699), variously referred to as the Original Shales, Shields and Schales. He was born in 1755, sired by Blaze (see chart, p. 120), and out of a Hackney mare. Shales sired Scot Shales (692), born in 1762 and Driver (187), born in 1765; the former said to have been famous as a breeder getting good stock out of common mares, though himself a poor racer, while the latter proved a great breeder, siring Jenkinson's Fireaway (201), born in 1780, who in turn sired West's Fireaway (203), born in 1800 and Wroot's Pretender (596), born in 1788. Fireaway (203) sired Burger's Fireaway (208), born in 1815, while Pretender (596) sired Stevens' Bellfounder (52), born in 1797. Fireaway (208) sired Ramsdell's Wildfire (864), born in 1827, and The Norfolk Cob (475), born in 1819, while Bellfounder (52) sired Jary's Bellfounder (55), born in 1816. Wildfire (864) sired Ramsdale's Phenomenon (573), born in 1835, while The Norfolk Cob (475) sired The Norfolk Phenomenon (522), born in 1824. Phenomenon (573) sired Performer (550), who in turn sired Beal's Sir Charles (768), born in 1843. Sir Charles (768) sired Bourda's Denmark (177), born in 1862, and Denmark (177) sired Danegelt (174), born in 1879. During recent years Denmark and Danegelt have been the most potent of the descendants of Shales. Other noted stallions are Lord Derby 2d, Bourda's Denmark, Triffitt's Fireaway, D'Oyley's Confidence, Duke of Connaught, Pasador and Sir Horace.

During the early development of the Hackney some of these Norfolk trotters showed remarkable speed (p. 115), especially when the distance traveled is considered, which, as has been stated, was of material benefit in the development of the Standardbred horse. Such records as made by Driver, said to have trotted 17 miles in one

hour, carrying about 200 pounds, are of common report.

The Hackney coach horse in America.—While the first importation dates back to 1822, when James Ford of Boston introduced Bellfounder (55) (see chart, p. 120),

FIG. 80.—HACKNEY STALLION "SIR HUMPHREY"

commonly known as Imported Bellfounder, no others of note occurred until 1881, when M. H. Cochrane of Hillhurst, Canada, imported a fine stallion named Fordham, a son of Denmark (177). A. J. Cassatt of Philadelphia established the first Hackney stud founded in the United States. He imported the noted stallion Little Wonder and the mares Patience and Buttercup in 1883, though

before this he had brought over the mare Stella by Confidence. Following this came the era of the horse show when extensive importations were made, chiefly into the New England states and Canada, with scattering ones to Ohio, Wisconsin and other Central states. The largest of these importations was made in 1890 by Seward Webb of Vermont, who imported 31 animals, four of which were stallions. Then came a lull in the horse-importing business, but the first decade of the twentieth century witnessed a revival of the industry, and the following are the best known of the more recent importers: F. C. Stevens, Attica, New York; Ebon D. Jordan, Boston, Massachusetts; Robert Beith, Bowmanville, Ontario, Canada; A. B. Hobert, Greeley, Iowa; J. H. Truman & Sons, Bushnell, Illinois; Fred Pabst, Oconomowoc, Wisconsin; Calkins and Angsbury, Byron, Michigan, and Seward Webb of Vermont.

FIG. 81.—HACKNEY STALLION "LORD MARLBOROUGH"

Famous Hackney coach stallions.—While there have been many notable Hackney stallions in the United States perhaps the most famous of the present time are Fandango and Langton Performer, owned by F. C. Stevens; Shawhill Duke, owned by P. E. Hoge; Bagthorpe Sultan, owned by Henry Fairflax; Tiger Lillie, owned by R. C. Vanderbilt; Meanwood Majesty, owned by Fred Pabst; Aquinus, owned by D. J. Driscoll, and Land o' Burns, owned by C. H. Mackay.

Some of the noteworthy prices paid during recent years are: Forest King, $13,000, by W. H. Moor; Matchless of Loudesboro, $15,000, by W. S. Webb; Hildred,

$10,000, by E. T. Bedford; $20,000 for the four-in-hand Flashlight, Electric Light, Lord Burleigh and Lord Brooke; $10,000 by W. H. Moor for the bantam stallion Berkley Bantam; and $20,000 by Mrs. E. C. Brown for the bantam four-in-hand Master, Masterpiece, Masterkey and Masterman.

Description of the Hackney coach horse.—There is much variation in type, although that most sought represents a powerfully built horse with round ribs, muscular loin, plump quarters and short legs. Perhaps the Hackney is more blocky in form than any of the other coach

FIG. 82.—HACKNEY BROOD MARES

breeds, giving him an extremely smooth appearance with gracefully curved outlines.

The head is of medium size, rather full, but with clean-cut features, and well carried; the eyes are large and clear and the ears medium size and specially alert. The neck is often rather full and of medium length. The shoulders are long, sloping and well muscled, favoring lifting power, which gives high knee action. The body is deep, the ribs round, and the back short and well muscled. The quarters are full and deep, with thighs well set and strongly muscled, thus favoring high hock action.

There is much variation in height. In 1885 the Hackney Stud Book Society of England, at the request of the

Royal Agricultural Society, increased the standard height for the breed to 15.2 hands. Hackneys are often classified according to height: Hackney ponies, under 14 hands; Hackney cobs, 14 to 15.2 hands; and Hackney coach horses, above 15.2 hands. The weight is also variable, but 1,000 pounds is a good weight for a mare and 1,200 pounds for a stallion. At present chestnut is the favored color, though all colors are found. White markings are also very common.

Much emphasis is placed upon soundness, and for the past few years the English Hackney Horse Society has

FIG. 83.—HACKNEY STOCK FARM

subjected the entries to its shows to veterinary examination. This has favored keeping the breed free from unsoundness; and the percentage rejected is very small, perhaps about 5% on the average.

The action.—Formerly the Hackney was valued for its long and strong action at the trot, but at the present time its chief merit resides in the high and often rather flashy action of the knees and hocks. It is said that Confidence (158) was noted for the transmission of this particular quality to his offspring. In the walk or trot the feet are lifted with snap and spring, and at the trot the front feet go forward after being uplifted, as if they were following

the rim of a wheel, while the hind feet are carried high as the hock is lifted sharply toward the body with much grace, strength and action. It is stylish, attractive action, not speed, that is important at the present time.

Uses of the Hackney coach horse.—The high knee and hock action and the attractive appearance, either standing or in motion, renders the Hackney very serviceable for stylish, heavy-harness, city driving. The breed has been improved with this special object in view, and it merits superior claims, excelling all other coach breeds in this particular field of activity. The degree to which the breed may be useful in producing a more general utility animal is not so clearly evident, though the Hackney is often used in crossing with common mares with a view of producing an all-around horse.

Distribution of the Hackney.—This breed is more widely distributed than any other coach breed. From England it has gone into France, Germany, Holland, Denmark, Belgium, Spain and Italy in Europe; east into Japan; south into Africa and Australia; and westward into the Argentine Republic in South America, as well as into Canada and the United States in North America. It is pressing its way into every country where heavy-harness horses are in demand. In the United States, the Hackney is found in largest numbers in New York, Pennsylvania, Massachusetts and Illinois, but numbers of the breed are becoming broadly scattered through the states in general.

Organizations and records.—The English Hackney Horse Society was organized in 1883 and published the first volume of its stud book in 1884. The American Hackney Horse Society was organized in 1891, and the first volume of the stud book was published in 1893. Since then five volumes have appeared, registering 1,550 stallions and 2,000 mares.

CHAPTER XII

THE FRENCH COACH HORSE

The name "French Coach" is of American origin, there being no breed of that name in France. The term "Demi Sang," meaning half-blood, is the name employed to designate the coach horse in France, and was originally applied to the offspring of English sire crossed to Norman mares.

The native home of the French Coach horse.—This breed of horses was developed in France, particularly in the counties of Calvados, Orne and La Manche, which, in connection with Eure et Loir and Sarthe, compose that section of France known as Normandy, a region famous for its horses. Because of the proximity to England this region was influenced by the race course, and much attention was given to the improvement of the horse stock, with the result that the light horses soon became noted for speed and endurance.

The origin of the French Coach horse.—Following the lead of England the French very early begun racing horses. In 1323, during the reign of Charles le Bel, it is stated that racing was rather common. In the latter part of the seventeenth century, during the reign of Louis XIV, systematic attempts to improve the racing horse were begun by the French government. Colbert, a representative of Louis XIV, established the "Administration des Haras" (administration of the Studs). This experiment proved successful, and did much to promote horse breeding in France. The work went rapidly forward and in 1714 a stud was founded at Le Pin, and in 1755 another stud, with 12 sub-studs, were established at Pompadour, both being under government control. These studs were destroyed during the revolution, but were

restored by Napoleon in 1806, and have ever since remained important breeding studs, where French horses have been greatly improved.

In the general improvement many sources were drawn on. English Thoroughbreds have been liberally imported

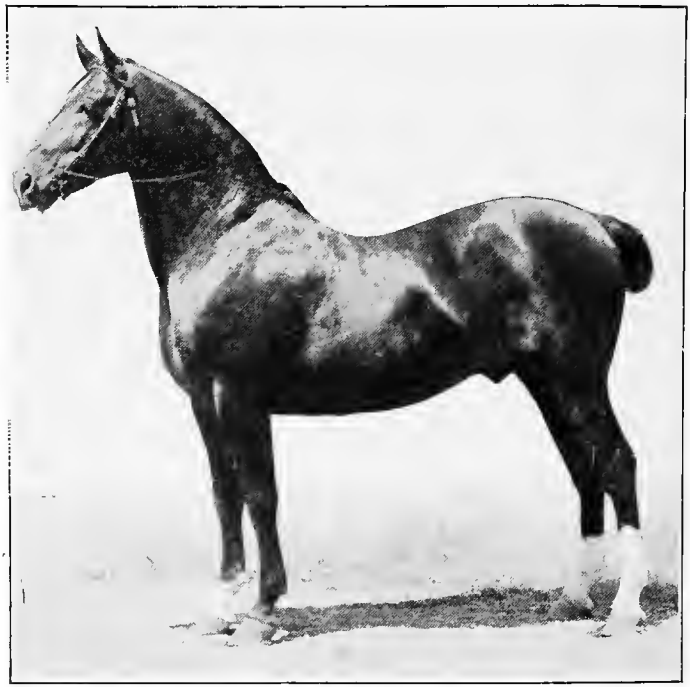

FIG. 84.—FRENCH COACH STALLION "PALADIN"

since the early days of the breed, and Norfolk trotters or Hackneys have been freely imported and liberally used. It is stated that in the inception of the breed 20 to 30 Hackneys were imported annually. Many importations from Arabia and other Oriental countries have been made, particularly at the beginning of government control, and

even stallions of American breeding have been used.

Good examples of the varied sources from which the French Coach sprang are exhibited in the stallions Niger, Tigris, Aemulus, Conquerant and Young Rattler, all of which were famous in the studs of France. Niger, born in 1869, was sired by Norfolk Phenomenon, and out of Miss Bell, a half-blood American mare; Tigris traces in direct male line to the English Thoroughbred, The Heir of Linne, imported to the stud at Tarbes, in 1859; Aemulus, born in 1871, was sired by Mambrino Paymaster, and out of Black Bess, a Morgan mare, thus combining the Mambrino and Morgan families of American trotters; Conquerant traces through both sire and dam to English stock; and Young Rattler, born in England, served the stud in Normandy from 1820 to 1834. After the breed became established fewer animals were imported and in recent years it is claimed that the breeding has been confined to French animals entirely. The restriction was promoted by the establishment of a stud book. This was designated "The French Stud Book: A Register of Demi-Sang Horses," and was established by royal decree in 1833, for the preservation of pedigrees; the first volume of which appeared in 1891, containing 3,219 stallions and 1,445 mares, registered between 1840 and 1890.

French methods for improving the horse.—Since the establishment of the "Administration des Haras" during the reign of Louis XIV, the French government has made systematic efforts to promote the horse-breeding industry and to improve the horses of France. As early as 1690 the government owned 1,600 stallions, classed as either "royal" or "approved." Notwithstanding the political disturbance and war the number of government horses increased, and in 1789 there were over 3,000 approved and government stallions in France, which served about 115,000 mares. The government continued to purchase stallions for its studs, and from 1815 to 1830 imported

223 from Arabia and other foreign countries, and in addition purchased 853 from the northern counties of France and selected 826 from the government studs, making a total of 1,902 stallions. It was at the close of this period that the French Jockey Club was organized and the stud book adopted by royal decree, which did much to further the industry.

In 1870, the management of the government studs was given to the Department of Agriculture and Commerce. The general control of all government studs was placed in charge of a director, who is assisted by sub-directors, inspectors, superintendents and veterinarians. Another significant fact in this control is that to hold one of the offices one must be a graduate of the horse department at Le Pin. Perhaps this contributes to the general uniformity of the horses throughout France more than any other single factor, and is in striking contrast to American methods as brought about by the various states' stallion laws, where instead of a few inspectors with a common type, there are many inspectors with equally as many types (p. 430).

Classes of public stallions in France.—There are three classes of public stallions standing in France: First, stallions owned in the government studs. In 1910 the number owned was 3,445, of which 2,214 were French Coach, 664 draft and 567 Thoroughbreds. Second, stallions owned privately, but approved or subsidized by the government. When thus approved the owners of such stallions are allowed from 300 to 5,000 francs ($60 to $1,000) bonus, annually, from the Minister of Agriculture. In 1910, there were 1,709 approved and subsidized stallions of all types in France. Third, stallions that are authorized, having been passed upon by the officials and found worthy of public service. In 1910, there were 191 authorized stallions of all types in France. All other stallions are prevented by a law passed in 1885 from standing for public service.

French Coach horse in America.—It is only recently that the French Coach horse has attracted attention in America. The late M. W. Dunham of Wayne, Illinois, and Powell Brothers of Springboro, Pennsylvania, were the first important breeders and importers in this country for years. In the early eighties extensive importations were made, largely to the eastern states, though many found their way westward to Ohio and Illinois. In the middle west the French Coach horse has been liberally patronized and when the foundation mares were of suitable type and possessed a fair degree of action, a high-class carriage horse has been the product.

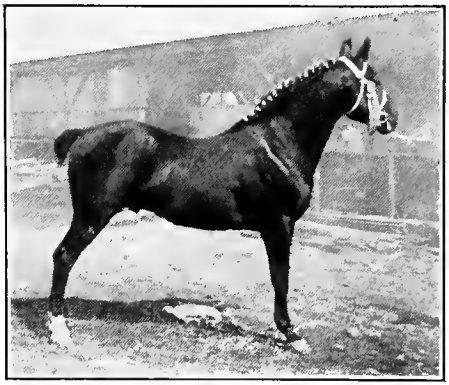

FIG. 85.—FRENCH COACH STALLION "CHAUDERNAGOR"

At the present time more French Coach horses are being imported than any other of the coach breeds, with the possible exception of the Hackney. The following are among the leading breeders or importers: Dunham Brothers, Wayne, Illinois; Taylor and Jones, Williamsville, Illinois; Robert Burgess & Son, Wenona, Illinois; McLaughlin Brothers, Columbus, Ohio; and Singmaster & Brother, Keota, Iowa.

Notable animals.—The following stallions are among the famous ones, each having 25 or more recorded produce in Volume I of the French Coach Stud Book of America: Perfection (993), by Bamjuls, and out of Charlotte, with 163 recorded produce; Paladin (1968), by Perfection, and out of Modestine, with 64 recorded produce;

Pepino (1413), by Perfection, and out of Tempest, with 27 recorded produce; Vengeur (2525), by Jagellon, and out of Bettina, with 29 recorded produce; and Regent, by Leverant, and out of Norma, with 26 recorded produce. The following mares are among the more famous, and each have ten or more recorded produce in Volume I: Hirondelle (166), by Niger, and Paquerette (169), by Omega, each with 14 recorded produce; Gazelle (409), by Oriental, Godabal (626), by Seneschal, and Verta (19), by Tamar, each with 11 recorded produce; and Eclatante (1006), by Courtesan, Genevieve II (361), by Stade, Goelette (165), by Rivoli, and Ordonnance (847), by Oronet, each with 10 recorded produce.

Description of the French Coach horse.—This breed presents much variation in general conformation, and will be described as consisting of two types, the coach type proper, which is the most common in America, and the trotting type, very popular in France.

The Coach type.—This is the larger and smoother sort, the stallions averaging 16 hands high and the mares 15.2 hands. The most acceptable weight for the stallion is about 1,350, with mares at 1,200 pounds. This type is rather upstanding, carrying the head and tail high. The animals are smooth and symmetrical, with very graceful movements, having fairly high and bold knee and hock action. The head is intelligent and of medium size; the neck is graceful and of good length; the shoulders are long and sloping; the body is well rounded and snugly ribbed with well-muscled loin, giving a short, strong back; the croup is full and of medium length; and the quarters long and powerfully muscled. The knees and hocks are strong and clean; the cannons short, with tendons well detached, with pasterns moderately sloping and feet dense and elastic. In general appearance, there is an airiness and gracefulness about the French Coach that is difficult to find in any other coacher, with the

possible exception of the Hackney. The common colors are bay, black, brown and chestnut.

The trotting type.—This is the smaller and perhaps more rangy sort; for, as might be expected, it is somewhat like the Norfolk trotter in general appearance, as the parentage is somewhat similar and the racing is conducted much as in Norfolk, largely under the saddle and carrying not less than 120 pounds. In this type stamina and substance as well as speed are required, since the races are for long distances over turf, which demands strong, bold going and powerful action.

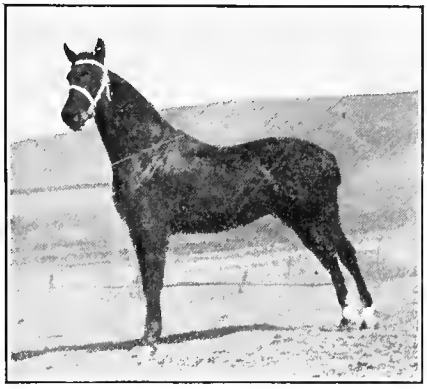

FIG. 86.—FRENCH COACH STALLION "FADIAVOLO"

Speed records and race tracks. — For many years racing under the saddle has been very popular among the French Coach breeders of France. In 1873 Niger trotted 2½ miles in 6.55; in 1875 Zethus trotted 12½ miles in 37.21, while Caen trotted the same distance in 37.19; and in 1877 the mare Zacinthe trotted 18¾ miles on an ordinary road in 59 minutes. Up to 1877 the fastest record was by Pactole, who trotted 2½ miles in 6.38. In 1891, there were 1,399 contestants in races, 312 of which trotted races from 2 to 3¾ miles in less than three minutes per mile, 137 under 2.50, 112 under 2.45 and 62 under 2.40. Of the 312, there were 101 three-year-olds. The average distance was 2 1/16 miles; the average time per mile, 2.50; the fastest time for the three-year-olds, distance 2½ miles, 6.33; and the fastest time for the five to seven-year-olds, distance 3⅛ miles, was eight minutes.

The French track is from two to three miles long, and is of turf. These sod tracks promote high knee action and long strides, as well as strong, well-flexed hock action, and in addition increase the stamina and endurance.

Uses of the French Coach horse.—In America, this breed is prominent for heavy-harness driving, while in France it is also used for saddle purposes, for racing and for the cavalry. In this country the French Coach stallions are often crossed on common mares for the production of a grade coach horse for general city purposes. When the mares were of the proper conformation and possessed sufficient quality success has usually followed such efforts. These grades possess much style and action, and in addition are of sufficient weight to command a high price on the market.

Distribution of the French Coach horse.—This breed is perhaps as widespread as the Hackney, but has not been bred systematically on a large scale except in France. Large numbers have been imported to America and are scattered throughout the North Atlantic and Central states, where they are in demand for general utility.

Organizations and records.—As previously stated, the French Coach Stud Book was established and the French Jockey Club organized in 1833 by a royal decree. This organized effort has been responsible for much of the development of the breed in France. In America the French Coach is represented by two societies, the French Coach Horse Society of America, organized in 1888, and with headquarters at Oak Park, Illinois, and the French Coach Horse Registry Company, organized in 1904, with headquarters at Columbus, Ohio. Each society has established a stud book and published at least one volume.

CHAPTER XIII

THE GERMAN COACH HORSE

In America we are accustomed to considering all horses imported from Germany as German Coach horses; whereas, Germany has several distinct breeds of horses varying greatly in size and conformation. This has led to much confusion as to the correct form of a German Coach horse.

The native home of the German Coach horse.—This breed was developed in northwestern Germany, particularly in the fertile lowlands drained by the Elbe, Weser and Ems rivers, a district in which the conditions are very favorable to the development of the horse. It was in this section that the great draft horse of Europe was originally found. The states that contributed to the development of the German Coach horse are Hanover, Oldenburg, Schleswig-Holstein and East Friesland.

The origin of the German Coach horse.—The German Empire is composed of numerous states and principalities. Owing to the number of separate governments involved prior to the consolidation of the Empire, there was no single fixed policy followed, for which reason there are many marked differences between the various strains of horses found in Germany. The multiplicity of states likewise renders it difficult to reach very accurate conclusions regarding the early history of most of the strains, but there is no doubt that in point of antiquity these horses rank with any of the other coach breeds.

The German Coach horse owes its origin to horses imported from the Orient, and other countries, which were crossed on the native mares of Germany. As early as 1552 Count Johanna imported horses from Turkey and southern Europe to Oldenburg, and took an active in-

terest in horse breeding. This eastern blood has been fused with the horses of Oldenburg for over three and one-half centuries. It is stated that a half century previous to this, annual fairs were held in Friesland, near the border of Holland, which attracted much attention by their horse shows and, no doubt, resulted in many importations, as these events were attended by horse

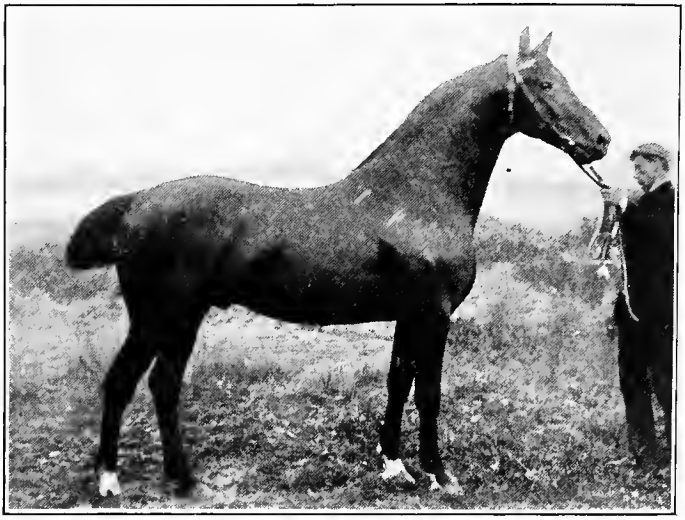

FIG. 87.—GERMAN COACH STALLION "NERO"

merchants from Holland, Belgium and Germany. A catalog of Prince Geo. Albrichts' stud, published in 1708, showed importations from Turkey, Poland, Hungary, Denmark, England and other countries. From this it would seem that the German Coach horse was of mixed ancestry. It does not appear, however, that the Germans made extended use of the English Thoroughbred in the evolution of their horse, although trace of the blood is plainly discernible.

German methods for improving the horse.—For centuries the governments of many of the principalities have promoted horse breeding. Early in the seventeenth century a government stud was established at Ilo which possessed 182 horses in 1648; from 1628 to 1648 the stables of Count Ulrich II contained many famous stallions; and in 1658 Count Enno Ludwig sent Emperor Leopold a number of horses described as very beautiful and of great value. Early in the eighteenth century a government stud was in operation at Harlingerland, in East Friesland, and a report dated 1712 refers to 16 stallions that served 819 mares.

Government supervision of horse breeding.—Formerly a few of the principalities, notably East Friesland, held very close supervision of horse breeding, which was regulated by royal edicts. Later more liberality was permitted, but it was made a law that no permits should be issued authorizing the public use of stallions, unless they passed a satisfactory government inspection. At present the government and the agricultural societies are encouraging horse breeding by awarding prizes to animals of special merit, such animals to remain in the country for a specified time. A commendable feature of the system is that first prizes are given only to mature stallions and mares that have shown merit as breeders. Large horse shows are held at Aurich, East Friesland, where the horses are brought each year for government inspection and approval. Horse breeding in Germany is greatly influenced by military requirements which has a bearing upon the type approved. This is so great a controlling factor that few of the powerful and compactly built type can be found.

TYPES AND BREEDS OF GERMAN HORSES

As previously stated, owing to the conditions prevailing in Germany, many types of German horses have been

developed. Perhaps the most noted of these are the East Prussian or Trakehnen horse, Hanoverian horse, Holstein horse, Oldenburg horse, East Friesland horse, and the Schleswig horse.

The East Prussian or Trakehnen horse.—East Prussia has more horses to the square mile, omitting towns of over 10,000 inhabitants, than any other part of Germany.

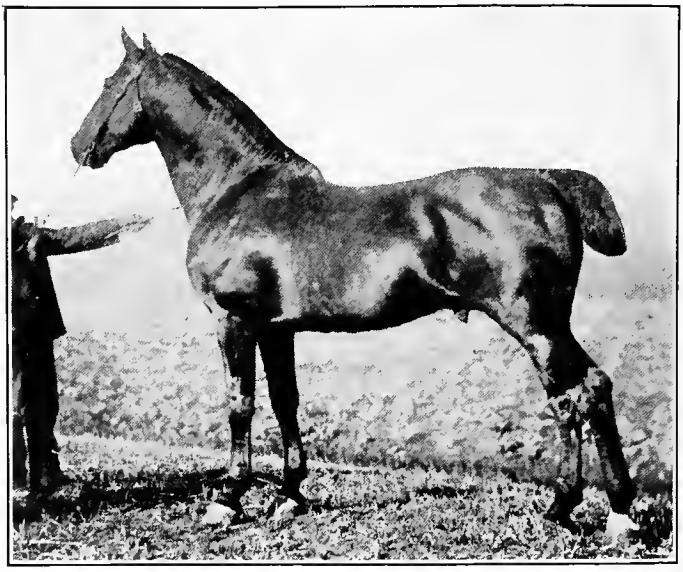

FIG. 88.—GERMAN COACH STALLION "LANDGRAF"

It supplies annually from 4,000 to 5,000 remounts to the Prussian army. The most important horse breeding center in East Prussia is the stud of Trakehnen, founded in 1732 by Frederick William I, King of Prussia, and father of Frederick the Great. He established this stud with 1,101 horses from the royal studs. There were many importations from the East and a few English Thoroughbreds added to the stud from time to time. The East

Prussian horse is described as having a good disposition, great endurance, a fine head, well-formed neck and a strong, well-ribbed back and loin. Count Wrangel states that the depth and slope of the shoulder are not satisfactory, legs rather too long, body too light for height, and that there is a lack of elegant action, though this is denied by Major Schoenbeck, who states that the action is usually good, and any faults in this respect can generally be cured by careful training.

The Hanoverian horse.—Through the influence of the English Hanoverian kings, many English Thoroughbreds were sent to Hanover between the years 1714 and 1837, where, owing to the fertile pasture lands and favorable conditions, the type of horse that resulted contains more substance than the East Prussian horse. The Hanoverian horse is used more for draft than for saddle purposes, although they have strong legs and a good back on which they can carry a load sufficiently heavy to make them serviceable military horses. The horses are bred by farmers who work the brood mares on their farms.

The Holstein horse.—For many centuries Holstein has been noted for its good horses. The splendid pasture lands of Kremper, which is in the district of Steinberg, on the banks of the Elbe, are particularly well known for their good horses. In size, these horses are about equal to the Hanoverian; they are powerful, with good legs and free action, are suitable for both riding and driving, and are in great demand. It is doubtful, however, whether the Holstein horse is as enduring as the East Prussian horse.

The Oldenburg horse.—This is perhaps the parent of the German Coach horse, and, as we have seen, owes its origin to Oriental and other imported blood. The Oldenburg horse averages 15.3 to 16.2 hands high and 1,200 to 1,400 pounds in weight, and is used for heavy coach work, but seldom as a saddler. Some writers state that the horses of this type are not of the best quality, but

stand high in public favor because of their great size, some being 17 hands high and broad in proportion. They have good dispositions and mature at an early age.

The East Friesland horse.—During the middle ages East Friesland bred a strong and heavy war horse, which gradually changed into a stately coach horse. The East Friesland horse is about the size of the Oldenburg horse

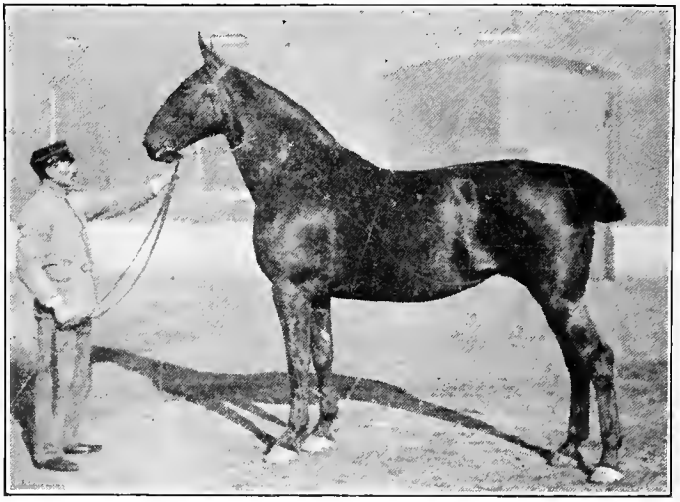

FIG. 89.—GERMAN COACH MARE "FOPE"

and has been developed under similar conditions. In a description of this type the East Friesland Stud Book states that the object of the breed is to produce a strong, noble and docile carriage horse which will develop quickly, and can be put to light agricultural work in its third year, in order to refund a part of its cost of rearing.

The Schleswig horse.—Though the character of the soil is variable in Schleswig the pastures are luxuriant and the conditions favorable for the production of horses which, in the middle ages, were able to carry knights in

heavy armor and to do all kinds of pack and draft work. While many kings and dukes established studs in Schleswig the one which remained the longest in existence was founded by Friedrich III in 1648. It is stated that present-day animals can be traced to his stud. In 1891 the Registered Union of Schleswig Horse Breeding Societies was formed with the stated object of "supplying a strong work horse that can fulfill agricultural, commercial and military requirements."

The German Coach horse in America.—It is only recently that the German Coach horse made his appearance in America, the first importations occurring in the eighties. About the year 1890 the breed began to gain recognition at our fairs and horse shows. Among the early importers may be mentioned A. B. Holbert of Greeley, Iowa, who was perhaps the first to introduce the breed; the Altmans, Watseka, Illinois, and J. Crouch & Son, Lafayette, Indiana. Perhaps by far the more important of the early animals imported was Moltke, who is credited with 51 recorded produce in Volume II of the German, Hanoverian, Oldenburg Coach Horse Stud Book. Other imported stallions of note are Kaiser Wilhelm (494) Young Altona I (458), and Young Adonis (476), as well as Bertus, Ento and Hannibal, the last four having distinguished show careers. In a study of the animals recorded in Volume II of the stud book it was found that Moltke leads as a sire, while others in order are: Ruthard with 48 recorded produce, Whittlesbacher with 35, Friebeuter with 31, and Elegant with 26 recorded produce.

The German government voted a large sum of money to make a display of German Coach horses at the Chicago World's Fair in 1893, and sent over a fine exhibit of stallions and mares. The provinces of Oldenburg, East Friesland and Hanover repeated this enterprise at the St. Louis World's Fair in 1904.

Description of the German Coach horse.—While there is considerable variation among German Coach horses in America, as in Germany, the height ranges from 16 to 16.2 hands and the weight from 1,350 to 1,450 pounds. The prevailing colors are bay, black and brown. The head is of medium size, full and well carried, the neck long and arched, the shoulders moderately sloping and the

FIG. 90.—GERMAN COACH MARE "FUNGE"

withers prominent. Compared with the French Coach, the body of the German Coach is larger and longer, though the back and loins are powerfully muscled, the croup high and the tail well placed. Compared with the Hackney, the legs show considerable more length, although well muscled and clean, while the feet are excellent. The action varies with the size and quality of the horse. Where there is not too much weight and sufficient quality the action is excellent, but as the weight

increases and the quality decreases it is the rule for the action to decrease also.

Use of the German Coach horse.—In the German Empire this is the horse-of-all-work. At home this breed is called on to do saddle work, the light as well as the heavy carriage work, and the draft work. In America the German Coach horse differs from other coach horses in at least two respects: First, there has never been any attempt to breed or train them to speed at the trot, and, second, some strains are decidedly heavier than the other coach horses and for this reason are not so active, though the lighter types make fair heavy-harness horses. In this country the German Coach horse has been used to some extent in crossing on common mares, but with varying success, and for this reason the breed is not so popular in cross-breeding as either the Hackney or the French Coach.

Distribution of the German Coach horse.—This breed is found in many countries throughout Europe, Eastern Asia, South Africa and both North and South America. In Canada, it is perhaps most popular in the Northwest. In the United States it is most popular in the Central States, particularly in Indiana, Illinois and Iowa, but is found in many parts of the country.

Organizations and records.—In Germany the breeders of each of the more important types, notably the East Prussian, Hanoverian, Holstein, Oldenburg, East Friesland and Schleswig, have organized associations and established stud books with a view of promoting the various types or breeds as they are known in Germany. The German, Hanoverian and Oldenburg Coach Horse Association of America was organized in Illinois in 1892 and a stud book established. Later the Oldenburg Coach Horse Association was organized, also in Illinois, and a stud book started. In this country there is much confusion in the public mind as to the various types of German Coach horses, due, perhaps, to the consolidation of

names and types in the German, Hanoverian and Oldenburg stud book. It would seem that the advocates of the breed would do well to clarify, in some permanent way, this apparent confusion.

Criticisms of the German Coach Horse.—In conformation this breed is exceedingly variable, the East Prussian horse being of the lighter type, while the Schleswig horse, because of the luxuriant pastures in Schleswig, contains greater substance and is of a more massive type. Among German horses coarseness is not uncommon, as seen in the large heads, the large rough joints, and the coarse heavy bone. From a coach horse point of view the action is frequently deficient. This contrast in symmetry, uniformity and stylish action can be clearly brought out by comparing the German coach horse with the Hackney, in which there is general harmony and frictionless movement.

CHAPTER XIV

THE CLEVELAND BAY COACH HORSE

Although the oldest of the large-sized coach horses, the Cleveland Bay has not met with so popular a favor in America as some other breeds of coach horses, particularly the blockier, more symmetrical and more stylish sorts. In England the breed has been more successful.

The native home of the Cleveland Bay coach horse.—This breed was developed in northeastern England, in the counties of Durham, Northumberland and more especially Yorkshire. It is in Yorkshire, among the Cleveland hills in the North and East Riding, that this breed is found in its greatest purity. The conditions were eminently suitable for the production of superior light horses. The people were horsemen, and the fertile valleys and hills, underlaid in the best grazing districts with limestone, were very productive of nutritious grasses.

The origin of the Cleveland Bay coach horse.—There is no authentic data regarding the origin of this breed, and the first records of the Cleveland horse connect him with being a pack or Chapman horse. Many theories have been advanced as to the probable origin, of which four are worthy of mention. First, it is asserted that the breed is a descendant of the "Old War Horse," improved by crossing with Oriental and English stock; second, that it has been gradually developed from the horse of southern England; the adherents state this is supported by the fact that a similar breed formerly existed in Devon, in the south of England; third, that it is a descendant of the old Scandinavian horse, improved by careful breeding under the different climatic conditions of England, and this claim, it is stated, is supported by the black points in the Cleveland horse; and, fourth, it is asserted

that the breed owes its origin to the use of Thoroughbreds on English cart-horse mares, though this theory is denied by the Cleveland Bay authorities who wish to show a pure ancestry.

Notwithstanding this objection, it is probable that a gradual use of horses of lighter breeding on heavy mares of the larger English breeds has finally resulted in the formation of the Cleveland coach horse. This is supported by the statement that of the three sires, Dark, Barley Harvest and Hole Hill Horse, which had most to do in establishing the Cleveland Bay, Dark traces in direct line to Darley Arabian. It is probable, however, that the old Cleveland Bay, the horse that was so popular in early days, had very little, if any, Thoroughbred blood in him considering the amount that has been used later.

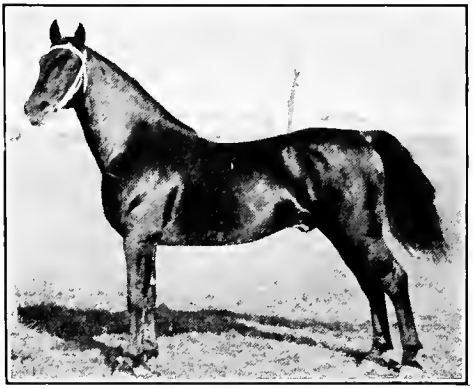

FIG. 91.—CLEVELAND BAY STALLION "BEODLOIN FRED"

The decline of the Cleveland Bay coach horse.—At the opening of the nineteenth century the Cleveland Bay was in great demand for heavy coach work, particularly matched teams for the London market. This stimulated breeding, which was carried on with system and success during the first quarter of the century. Following this came economic changes which influenced the type of horse demanded. Chief of these economic changes were the increased activity in agriculture and the development of the coal industry, which created a very strong demand

for heavier horses; and the improving of the public roads, resulting in the use of lighter vehicles, thus calling for lighter horses for road work, all of which operated to reduce the demand for a heavy coach horse. It was more profitable, therefore, to breed the heavy draft horse for draft and the lighter and more active horse for the road and so the Cleveland Bay fell into disfavor and was neglected.

After some years the breed began to adapt itself to condition, and from 1851 to 1867 it was in considerable favor, when there came a second decline in its popularity. Perhaps the development of the railroads was responsible for this decline. When the outlook seemed darkest, the American trade opened up, and in 1884 the Cleveland Bay Horse Society was organized and a stud book established, the object being to promote the purity of the breed and to put it in proper relation to the public. This did not stimulate the anticipated interest, for in 1885, at the show of the Royal Agricultural Society, held in the County of York, the stronghold of the breed, but one entry of a Cleveland Bay was made, and that was a mare in foal. During the last decade of the nineteenth, and the first decade of the twentieth century, the breeding of Cleveland Bays has attracted some attention, as is shown by the show of the Royal Society in 1900, again held in York, when 41 entries were made. Since then a number of creditable exhibits have been made in various English shows.

The Yorkshire Coach horse.—Because of its relationship to the Cleveland Bay the Yorkshire Coach is mentioned here. In England there is a Yorkshire Coach Horse Society in addition to a Cleveland Bay Horse Society, and each has established a stud book, so that the horses are registered separately and the two breeds are distinct. In America, however, the Yorkshire Coach horse and the Cleveland Bay horse are considered as one breed, and are

registered in the Cleveland Bay Stud Book by the Cleveland Bay Society of America.

The Yorkshire Coach horse is an offshoot of the Cleveland Bay, but it has been recognized as a distinct variety for over a century in England. It is designated as an improved Cleveland, free use having been made of Thoroughbred blood. As to the origin and characteristics of the Yorkshire Coach horse, the Yorkshire Stud Book, published in 1887, states that it cannot be claimed for the Yorkshire Coach horse, that he is a pure-bred animal, but that on the contrary, by the judicious crossing of large-sized, good-colored mares with stallions, altogether or nearly Thoroughbred, a class of horses has been produced suited to the wants and circumstances of the times. By universal consent, the color should be bay or brown, with black eyes; mane and tail, abundant but not curly; the height, from 16 hands to 16 hands 2 inches, with fine head, sloping shoulders, strong loins, and lengthy quarters, high-stepping action, good sound feet, flat legs, and abundance of bone and muscle.

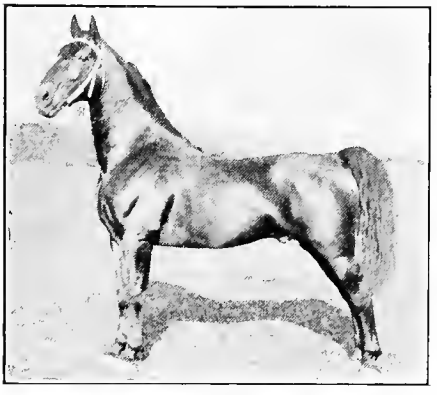

FIG. 92.—CLEVELAND BAY STALLION

From the early records it would seem that much was made of the speed, power and endurance of these horses, as Dreadnought, by Old Clothier, won a trotting match for £100, carrying 124 pounds 16 miles within an hour; Plato, the brother of Wonderful, the noted premium winner at the Ripon show in 1819, trotted 18

miles within the hour, carrying 144 pounds; and B. Pullen's King William trotted a mile in three minutes at Selby, carrying 112 pounds.

The Cleveland Bay coach horse in America.—This breed has never been popular in America. In the early eighties Geo. E. Brown & Company of Aurora, Illinois, W. M. Fields & Bro. of Cedar Rapids, Iowa, Jesse Harris of Fort Collins, Colorado, and Stericker Bros. of Springfield, Illinois, imported a number of unusually good representatives, but the type and breed characteristics never found favor. Formerly there was considerable interest taken in the show ring, particularly by the Sterickers, who made many attractive exhibits, but at present specimens of Cleveland Bays are almost unknown in our horse shows. Further, importations are rarely made, as there is not a single breeder prominently advocating the merits of the breed.

Description of the Cleveland Bay coach horse.—In the first volume of the Cleveland Stud Book, which was published in 1884, there is the following description of the Cleveland Bay horse: "From 16 hands 1 inch to 16 hands 2½ inches in height, he should be possessed of good, sloping shoulders, a short back, powerful loins, and long quarters. His head is rather plain than otherwise, and on the large size, but it is well carried, and his general appearance denotes activity and strength, combined in a manner not seen in any other breed. His action is not remarkably high, but it is the kind of action for getting over ground. In color he is bay—either light or dark—with black legs, clear of hair, and black zebra-like stripes on the arm and above the hock are sometimes seen. These are known as the 'black points,' and are supposed to denote special breeding. White, save a small star, or a few white hairs in the head, is not admissible, a blaze or a white foot proclaiming at once the admixture of foreign blood."

The best specimens that have been imported to

this country weigh from 1,200 or 1,550 pounds. While the breed ranks among the largest of the coachers, it lacks somewhat the quality and action of the other coach breeds. In coach and carriage horses, high and attractive knee action with good hock action is essential. Such action must be combined with a smooth, stylish and symmetrical appearance, which in turn must be associated with quality in all the parts. Since the Cleveland Bay did not approach the excellence shown by other breeds in this respect, it failed to attract popular favor.

The Yorkshire Coach horse is described as strongly

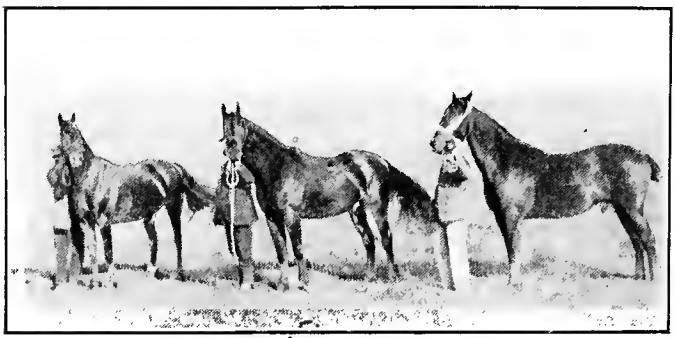

FIG. 93.—CLEVELAND BAY GELDINGS

resembling the Cleveland Bay in some respects, but is taller and shows more style and quality. The head is more refined and the crest more developed. The action is also freer, as well as higher.

Uses of the Cleveland Bay coach horse.—While this breed was formerly in very great demand for heavy-harness driving, it failed to keep pace with the times, and other breeds have succeeded it. Stallions of the breed have been used to some extent in crossing on the common mares, with varying success. They have one advantage in that there is uniformity in color and mark-

ings, which they seem to be potent in transmitting, when crossed on common mares. Because of this their get is uniform and easily matched into teams. Cleveland Bay coach horses seem to have plenty of stamina and fair quality, which, in connection with their size and good disposition, adapt them to work on the farm better than the other breeds of light horses, but, for some reason, perhaps because of the deficient action, they have never met with favor in America.

Distribution of the Cleveland Bay coach horse.—This breed seems to have enjoyed some popularity in South

FIG. 94.—CLEVELAND BAY MARES AND COLTS

Africa, to which country many are being exported at the present time. Aside from importations to North America, the Cleveland Bay has been taken to South America, Australia and Sweden. Those brought to America were distributed throughout the Central states and Canada.

Organizations and records.—As previously stated, in England there is a society and stud book supporting each the Cleveland Bay coach and the Yorkshire Coach. In 1885, the Cleveland Bay Society of America was organ-

ized and a stud book established, of which two volumes have been published, the last dated 1891, thus showing the lack of interest in recent years. Both Cleveland Bay and Yorkshire Coach are recorded in the American Cleveland Bay Stud Book.

Criticisms of the Cleveland Bay.—As with the German Coach, this breed lacks the general symmetry of form and the stylish carriage so essential to coach horses in America. The Cleveland Bay is rather upstanding, with long legs, which are often deficient in quality. The head is often plain and often lacking in quality. The rear ribs are frequently deficient in length, giving the body a rangy appearance; the action, one of the most important characteristics of a coach horse, is not stylish and lacks in animation.

CHAPTER XV

THE PERCHERON DRAFT HORSE

Of the various breeds of pure-bred horses in America, the Percheron draft horse is the most popular. This breed secured a foothold in Ohio in the early fifties, from which place it has spread in all directions with amazing rapidity.

The native home of the Percheron draft horse.—This breed was developed in northwestern France, especially in that section of the country known as La Perche, a district situated to the south and west of Paris, and embracing a considerable portion of the territory that is included in the modern departments or counties of Orne, Eure et Loir, Loir et Cher and Sarthe. La Perche is about 50 by 60 miles in area, with a rather broken surface, having numerous valleys and small streams of water. The soil is fertile, producing nutritious grasses, and the climate favorable for the production of horses of the highest excellence, while the inhabitants have long been noted for their attachment to the horse. All of northwestern France, from Paris to the English channel, has from time immemorial been famous as a horse-producing region.

The origin of the Percheron draft horse.—The source of this breed is to be found in the large infusion of eastern blood upon the native stock of La Perche, a district already distinguished for the size and strength of its horses, as well as to the natural adaptation of the soil and climate and the habits of the people. In 732 France was invaded by the Saracens, 300,000 strong, who were defeated by Charles Martel on the plains of Vonille. The Arab and Barb steeds upon which the infidels were mounted fell into the hands of the victors, and were assigned largely to the men of La Perche, Orleans and

Normandy. Other large infusions of Eastern blood took place upon the return of the Crusaders, who brought with them many of the finest Arabian stallions. These horses, crossed upon the large, strong, native mares, imparted a degree of refinement and finish that has ever since characterized the horses of northern France.

There were other countries besides Arabia, however, that contributed horses to La Perche, to aid in the development of the draft horse of France. Madame du Barry of Paris received a gift of a pair of Danish horses about 1775, which became so popular that they were followed by others of the same kind, with the result that Danish horses were used extensively in Normandy. English stock was also introduced, as were horses from Belgium and adjoining districts, particularly Flanders. In addition, reference is made to horses being introduced from Andalusia, Spain.

Early development of the Percheron draft horse.—In 1820, two famous Arabian stallions, Godolphin and Gallipoli, were imported and extensively used under the direction of the government at the stud of Pin. These horses were gray and no doubt had much influence in developing the gray color of the draft horses of France. Further, these two sires are given credit for much of the quality, style and finish possessed by the Percheron. Gallipoli, in particular, had a very beneficial influence, especially through his grandson, Jean Le Blanc, born in 1823, and regarded as the greatest sire of his day.

The type of horse resulting from the use of eastern stallions upon the mares of La Perche was a smaller and more active animal than the Percheron of the present time, and was more suited to general purposes. This early type is described as showing much less scale and ranging from 15 to 16 hands high with a draft conformation; the head of medium size and clean cut, frequently as fine as an Arab's; the neck rather short; the shoulders long and sloping with chest deep and broad; the body well ribbed

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being natural horsemen, take pride in preparing their horses for these shows. The more important shows are held under different conditions. A great central show is held at Paris each year. The annual Percheron show is held in a migratory way, coming back to the same place every 12 years. Each year the Percheron Society holds a show in the district of La Perche at either La Ferte, Mortagne or Nogent-le-Rotrou. While the success of these horse fairs and the rapid improvement in the breed were due to the united effort of all the breeders, large and small, yet a few of the more noted breeders are Perriot Brothers, M. Fardonet, Sr., M. Tacheau, and Louis Eveline.

Endurance and speed of the Percheron.—It is interesting to note the speed and endurance of the Percheron of half a century ago, when he was used extensively in the mail and coach service. Trials were made also under the saddle and in light harness. These early tests demonstrate the endurance of the Percheron as well as his ability to trot fast while carrying or drawing a heavy load.

The courses most frequented were those at Illiers, Courtalain, Montdoubleau and Mortagne, which are described as very crude, often consisting of plowed fields, which became hard in dry weather, but cut up like peat bog in wet times. In 1864 Julie trotted 1¼ miles, under the saddle, at Montdoubleau, in 3 minutes and 50 seconds; in the same year Vaillante trotted 1⅝ miles, at Mortagne, in 4 minutes and 38 seconds; while in 1861 Cocatle trotted two miles at Illiers in 6 minutes 5½ seconds. In 1865 Achille trotted two miles in harness at Illiers in 7 minutes and 17 seconds; while in 1851, Vigoreux trotted 2½ miles in 8 minutes and 30 seconds over the same course. It is stated that in 1854 a gray mare hitched to a traveling gig and belonging to Mr. Montrevil trotted 55¾ miles on a hilly and difficult road in 4 hours and 24 minutes.

The Percheron draft horse in America.—The introduction of French draft horses to America dates back as early as 1816 when a stallion was taken to Quebec. About 1826 this horse was sold to James McNitt of Washington county, New York, and was known throughout that

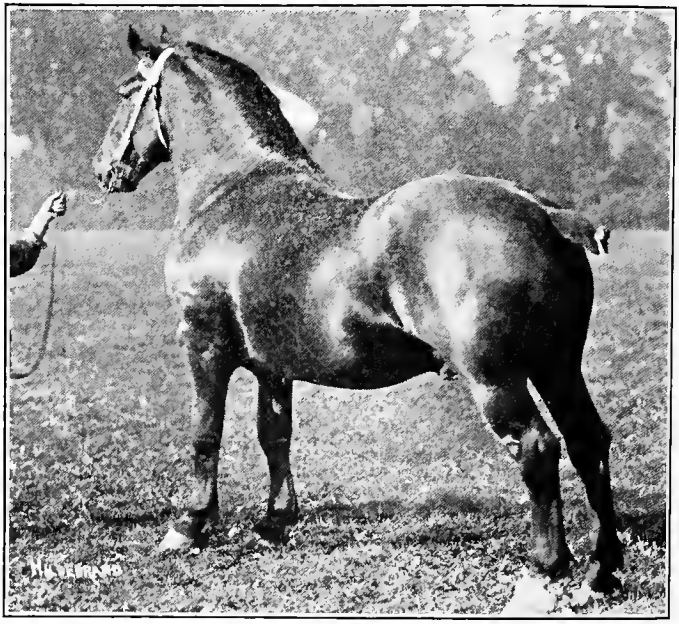

FIG. 96.—PERCHERON STALLION "KLAQUEUR"

region under the various names of European, Norman and the McNitt Horse. His fame has been chiefly perpetuated through this son, the Morse Horse, sire of Alexander's Norman. In 1839 Edward Harris of Moorestown, New Jersey, made two importations, the first consisting of one stallion and two mares and the second of two stallions, Diligence and Bonaparte, and two mares. The first was unsuccessful, as the stallion died at sea, one

of the mares landed in poor health, while the other injured herself by breaking through the floor of the car during shipment, which necessitated killing her. The second attempt was successful, as all four animals landed in good health. These were the smaller type of Percheron, standing about 15 hands high and weighing 1,200 to 1,500 pounds. Diligence, who died in 1860, was regarded as a fine specimen, and left a marked impression upon the stock of New Jersey and eastern Pennsylvania.

Three famous imported Percheron sires.—It was not until about 1850 that the Percherons began to attract favorable attention in the United States. About this time there were three stallions imported that proved to be remarkable sires, namely, Louis Napoleon, Normandy and Success.

Louis Napoleon.—In 1851 Fullington and Martin of Milford Center, Union county, Ohio, imported a gray three-year-old colt under the name of Louis Napoleon. This horse is described as not of largest type, but short-legged, closely ribbed and compact, standing 15.2 hands high and weighing in full flesh about 1,600 pounds. At the time of his importation he was a dark iron-gray, but long before his death became perfectly white. He was much criticized at first because of his size, but his colts showed up so remarkable that he became very popular as a sire. In 1856 Louis Napoleon was purchased by A. P. Cushman of De Witt county, Illinois, and his popularity in the West became even greater than in Ohio. A large number of Louis Napoleon's colts were left entire, and it is estimated that over 400 of these were successful sires.

Normandy.—In 1851 Marcus Brown of Circleville, Pickaway county, Ohio, imported a three-year-old colt, which was subsequently registered in Volume I of the Percheron-Norman Stud Book as Normandy 351. This colt was not so large as Louis Napoleon, and is described as never weighing over 1,500 pounds, and was about 15.2

hands high. He was kept for service near Circleville until 1856, when he was taken to Pleasant Valley, Madison county, Ohio, where he remained until his death in 1872. He was known by various names, as Old Bill, the Valley Horse, and the French Horse. Normandy was a sure breeder, and did more than any other to increase the popularity of heavy horses in Central Ohio.

Success.—In 1868 W. J. Edwards of Clifton, Iroquois county, Illinois, imported two stallions, Success and French Emperor, both of which were soon afterward sold to the Fletcher Horse Company. In 1874 M. W. Dunham purchased the company and Success, in whose hands the stallion proved the right to own his name, as he left a very marked impression on the heavy-horse stock of Illinois. Success is described as being about 16 hands high and weighing about 1,600 pounds. It is also stated that his get were usually large, compactly built, clean limbed, and very stylish, whether from large or small mares.

Other famous imported sires.—The following table contains a few of the more notable early imported sires, the date of birth, the date of importation, and the sire and dam:

Name	Date of birth	Date of importation	Sire	Dam
Vidocuq 483	1869	1874	Coco II (714)	Dam by Cheri
Brilliant 1271	1876	1881	Brilliant (756)	Ragout, by Favori I (711)
French Monarch 205	1865	1874	Ilderim (5302)	Dam, by Vieux Pierre (894)
Fenelon 2682	1880	1883	Brilliant (755)	Ernestine, by Duke of Perche, (740)
La Ferte 5144	1881	1886	Philibert (760)	Julie, by Brilliant (756)
Gilbert 5154	1882	1886	Brilliant (755)	Sophie (7694)
Seducteur 8850	1884	1888	Fenelon (38)	Rosalie, by Brilliant (756)

Early importers.—There were a few other notable importers in the fifties which were followed by large numbers in the sixties. In 1851 Captain Samuel Holmes of

Chester Springs, Pennsylvania, brought two stallions from France, and during the same year two others were imported, one for J. J. Parker of West Chester and the other for Edward Shippen of Meadville. In 1856 Gordon and Martin of Woodstock, Ohio, imported a stallion subsequently registered in Volume I of the stud book as Rollin 418. Soon afterward this stallion was taken to Illinois, where he acquired a great local reputation. In 1866 W. T. Walters of Baltimore, Maryland, imported several stallions and mares. Walters was the first person to establish a breeding stud in America. He had lived in France, where he made a close study of horse breeding, and hence was able to buy to advantage.

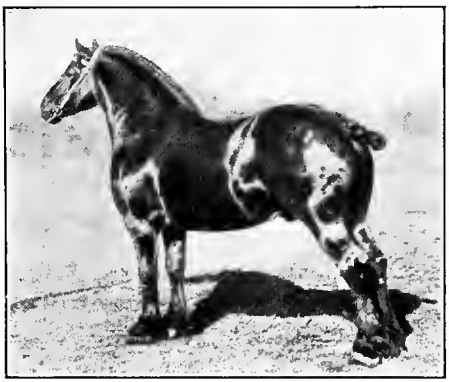

FIG. 97.—PERCHERON STALLION "MY LORD"

In 1870 M. W. Dunham, of Wayne, Illinois, and in 1874 W. Singmaster of Keota, Iowa, began breeding and importing, both of whom became famous Percheron authorities. In addition the Stubblefields of Bloomington, Ellis Dillon of Normal and Ezra Stetson of Neponset, Illinois, A. W. Cook of Charles City, Iowa, and the Fullingtons of Irwin Station, Ohio, were early breeders and importers.

Notable American Percheron breeders.—While it is rather difficult to determine the leading breeders, because some persons have a few very famous animals while others have a large number of only fair animals, yet the following are among the more notable breeders of Percherons in the country at the present time: H. G. Mc-

Millan & Sons, Rock Rapids, Iowa; A. L. Robinson & Son, Pekin, W. S. Corsa, White Hall, and Dunhams, Wayne, Illinois; C. M. Jones, Plain City, Ohio; and E. B. White, Leesburg, Virginia.

During recent years some very fancy prices have been paid for Percheron stallions. In 1910 W. S. Corsa of White Hall paid $10,000 for Carnot (66666); in 1905 McLaughlin Brothers of Columbus, Ohio, sold Rosenberg, grand champion Percheron at the International Live Stock Exposition, for $8,000; and in 1903 the same firm sold Pour-Quoi-Pas (27248) for $7,000 and Orangiste (29606) for $5,500. In addition to these some very good prices have been paid for Percheron geldings, especially when well matched and suitable for show purposes. In 1905 the Pabst Brewing Company purchased a pair for $1,300.

Famous show animals.—In recent years the exhibits of Percheron horses at the various fairs and horse shows have attracted favorable comment, and the following table gives a few of the more noted prize-winning stallions and mares at the International Live Stock Exposition, Chicago:

Stallions	Mares
Imprecation, by Pinsion	Castille, by Telamaque
Hautbois, by Pavissant	Imprudente, by Volcan
Jureur, by Fier-a-Bras	Jupilles, by Conscrit
Helix, by Dynamo	Iolanthe, by Calypso
Intime, by Agricole	Himere, by Etudiant
Carnot, by Balleau	Aueroita, by Aride
Halicte, by Paulno	Annette, by Calypso

Description of the Percheron draft horse.—The best type of Percheron calls for all the characteristics of a model draft horse. The general appearance is massive, muscular and powerful. In weight, mature stallions average from 1,700 to 2,000 pounds and mares from 1,500 to 1,800 pounds, though there are many exceptions, as

stallions sometimes weigh as much as 2,300 pounds. In height the stallions range from 15.2 to 17 hands, and mares from 15.2 to 16.2 hands. The low-set and massive form is preferred to the upstanding one. In color there is much variation, gray being favored in France, while darker colors are preferred in this country. All colors are found, with black and gray predominating. The action, especially at the walk, is of the very best for heavy horses.

The head is often rather large and full, but neat and clean, the forehead broad, the face straight or slightly dished above the nose, and the jaw strong; the eyes full and prominent, and the ears refined and attractively set and well carried. The neck is short but graceful. It is smoothly blended with the body and cleanly attached to the head, with an abundance of mane and foretop. The head and neck are very attractive, suggestive of the Arabian. The shoulders are set at a medium inclination, neither too straight nor too sloping, thus giving a powerful movement for draft. The chest is full and deep, the distance from the withers to the floor of the chest equaling that from the chest to the ground. The ribs are strongly arched and of great depth, giving a broad, deep body.

The back is short, broad and well muscled, and the underline fairly long. The loin is broad and muscular. The croup is powerful, but often too sloping. The legs above the knees and hocks are powerfully muscled. While the joints and cannons are not so clean cut and dense as in the lighter horses, yet they are as clean and hard as in any of the heavier horses. The pasterns are not so long and sloping as in the lighter breeds, but are excellent for draft. The feet are large, with open heels and dense elastic hoofs.

Uses of the Percheron draft horse.—As a draft horse, the pure-bred or high-grade Percheron has no superior either in America or France. The greatest usefulness of

the pure-bred stallion lies in mating to the larger type of grade mares which furnish us our best draft teams. A large proportion of our draft teams contain Percheron blood, as this breed is used more extensively in grading up the draft horse than any other in the United States (p. 434). Good results are obtained by crossing the Percheron stallion on pure-bred draft mares of other breeds, as the Clyde and Shire. The resulting offspring is usually clean legged and readily fills the general market demand. The most prominent buyers of New York and Chicago have testified in the highest terms to the demand for Percheron grades.

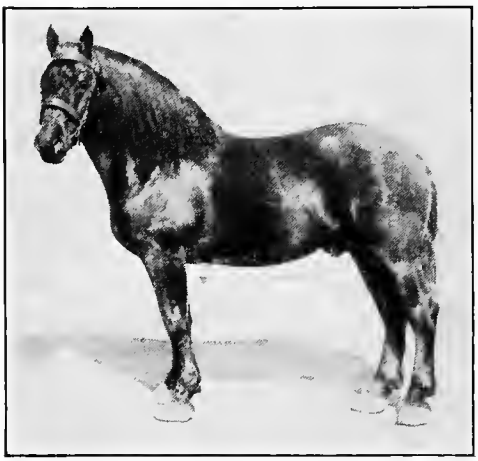

FIG. 98.—PERCHERON STALLION "NEGRO"

Distribution of the Percheron draft horse.—Because of the general excellence of this breed it is very widespread, having been introduced to all countries interested in the development of heavy horses. By far the greater number have been imported to America and they have found their way into almost every state in the Union and into Canada. The records show that between 1851 and 1883 nearly 4,000 Percherons were imported or bred in the United States, which were distributed as follows: Illinois, 1,834; Ohio, Indiana and Michigan, 577; Wisconsin, Iowa and Minnesota, 424; New York, Pennsylvania and New Jersey, 280; Missouri, Kansas and Nebraska,

186. Of the 4,000 it is stated that 2,600 were imported during the last three years, 1881-3, while in 1884 more than 2,000 of all ages were brought to America. At the present time there is great activity in the Percheron breeding and importing industry, which seems to center about Illinois, Ohio and Iowa, with all states represented.

Organizations and records.—In 1883 the Societe Hippique Percheronne of France was organized, and during the same year published its first stud book, which, since 1885, has accepted for entry only horses whose ancestors are registered in the book.

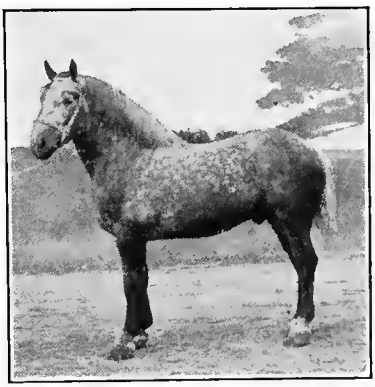

FIG. 99.—PERCHERON STALLION "JANTIER"

In America there have been many dissensions among the importers and breeders of French draft horses leading to the formation of several societies and stud books. This dates back to 1876 when the first steps were taken to found an American stud book. As this was before the establishment of the French stud book many of the draft horses imported from France were called Norman, and it was decided to adopt that as the breed name. J. H. Sanders, the secretary of the association, added the word Percheron to the title, so that it read Percheron-Norman Horse Association. Later his action was approved, as many draft horses were imported from France under the name Percheron. Many breeders of French horses, however, were in favor of the term Norman, and accordingly withdrew and organized the National Register of Norman Horses, which was later changed to the National Register of French Draft Horses (p. 186). When the

Percheron Society of France was organized the word Norman was dropped from the American title, in order to correspond with the French Association.

The Percheron Stud Book had reached the point of being recognized as the distinct representative of the Percheron breed, when internal dissension arose over the power vested in the secretary. The outcome was the organizing of three associations and the establishment of as many stud books. In 1902 the American Percheron Horse Breeders' and Importers' Association was organized, but in 1905 the name was changed to the Percheron Society of America, with headquarters at Union Stock Yards, Chicago. In 1904 the Percheron Registry Company was organized with headquarters at Columbus, Ohio, and in 1905, the American Breeders' and Importers' Percheron Registry was organized, with headquarters at Plainfield, Ohio. In 1904, after extended litigation, the American Percheron Horse Breeders' and Importers' Association acquired the old stud book and all of the original records, and in 1911, after the name had been changed to the Percheron Society of America, it acquired the Percheron Registry Company, so that at the present time the only important society promoting the breed is the Percheron Society of America, which publishes the Percheron Stud Book of America, of which 12 volumes have appeared, registering about 78,000 animals.

CHAPTER XVI

THE FRENCH DRAFT HORSE

In France, a number of types and breeds of draft horses have been developed taking their names largely from the localities in which they originated. Here they are recognized as distinct breeds, but from time to time specimens of most of them have been imported to America as French Draft horses, which has led to some confusion in names, as there is no single French Draft breed in France. The matter has been still further complicated, in the United States, by the organization of a French Draft Horse Society, which publishes a French Draft stud book in which all draft horses introduced from France may be recorded. The Percheron is, of course, the best-known French draft horse in America, and by far the larger number of remaining draft horses introduced to this country from France belongs to one of the following breeds: Boulonnais, Bretons, Ardennais, Nivernais and Picardy, of which the first is the more important.

Boulonnais draft horse.—This breed is a native of Boulogne, a district in northeastern France, adjoining Belgium, from which it derives its name. The Boulonnais horses, without doubt, had their origin in much the same manner as the Percheron, although it is claimed by the French that there is no interchange between the horses of Boulogne and La Perche, and that the Boulonnais has mainly been improved by selection and care. The breed has an excellent reputation in France, and is regarded as second only in importance to the Percheron. It is also growing in popularity in America.

The Boulonnais resembles the Percheron in general characteristics, so much so that it is impossible in the best specimens to distinguish one from the other. They

are not so large as the Percherons and perhaps somewhat less refined, lacking the improvement in type of the Percheron. Many American breeders, however, favor the feet of the Boulonnais in preference to those of any of the other French breeds. It is stated that the feet are larger, more rounded and the pasterns have more slope than the Percherons. The colors are much the same as the Percheron, with perhaps a larger number of grays.

Breton draft horse.—This breed is a native of Brittany, a prominent horse-breeding district, although the animals

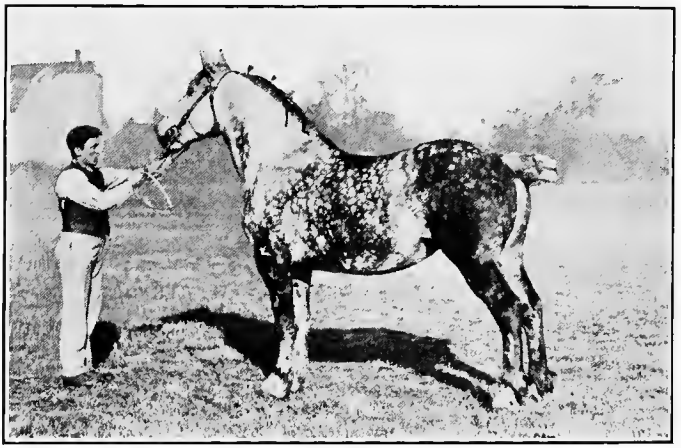

FIG. 100.—FRENCH DRAFT HORSE

bred are rather of a miscellaneous type. The early origin was much the same as the Percheron, and it is suggested that British horses were introduced into Brittany, which possibly accounts for the more luxuriant growth of hair about the legs of the Bretons. In recent years many Percheron stallions have been taken into the district in an effort to improve the breed in size and general characters.

The Breton draft horse has much the same general character as the old-style Percherons, but is smaller and

more refined. He has an intelligent head, a clean-cut neck of medium length, a round, well-muscled body with a short back. As a rule, the croup and rump is longer and straighter than in the other French breeds. The legs show more quality, though not so free from long hair as the Percheron, while the feet are larger and more rounded than the Boulonnais. The color is usually gray, although there are exceptions, as in the Boulonnais.

Ardennais draft horse.—This breed is a native of Ardennais, a district adjoining the Belgian frontier in northeastern France. The early origin was much the same as the Percheron, though, no doubt, Belgian blood was used to a more or less extent, which is suggested by the resemblance between the Ardennais draft horse and the Belgian draft horse, though the latter possesses more substance.

In general appearance the Ardennais is more massive and blocky than the Percheron, although not so large. The head is large and strong, with small, clean eyes and small ears; the neck is short and thick, and the shoulders are rather straight and heavily muscled. The body is short, but thick and deep; the loins powerfully muscled, with the croup and quarters broad and heavily muscled. The legs are short and well muscled, of fairly good quality, although the feet are often rather high and narrow. In color the Ardennais draft horse is more frequently roan and chestnut, although bay and brown are sometimes found. Gray, the common color among other French draft horses, is seldom found.

Nivernais draft horse.—This breed is a native of the department of Nivernais or Nievre in central France. The origin of the Nivernais draft horse is to be found in the large black horse, native to the low fertile valleys of France, from which it obtains its size and color. It is only within the last few years that its interests have been looked after and choice specimens of the breed are not very numerous. It is stated that the transformation in size and color of the Percheron horse in the past few

years has been brought about, to some extent at least, by the use of the best types of Nivernais draft stallions crossed on the mares of La Perche.

The Nivernais draft horse compares favorably with the Percheron in size, possessing more bone, and perhaps a little more rangy in general conformation. The head is large and full; the neck of good length and heavy; the shoulders massive; the body of good length and well coupled; the hindquarters powerfully muscled; and the bone strong, giving the legs a rather round appearance. The pasterns are fairly straight and the feet large. The color is almost uniformly black, and it is very seldom that a gray, brown or chestnut is found.

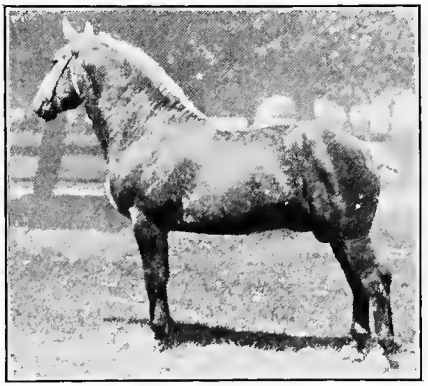

FIG. 101.—FRENCH DRAFT STALLION

Picardy draft horse. — This breed is a native of northern France and Belgium. It is bred in both countries, and is variously classified. Some persons claim it to be Flemish, and hence a Belgian breed, while M. La Motte Rouge of the government studs of France, claims it to be a variety of Boulonnais draft horse. The Picardy draft horse compares favorably with the Belgian draft horse in size and general conformation, being blocky and compact. The color is usually bay, although others are often found.

Organizations and records.—In France each of the types and breeds mentioned above, with the possible exception of Picardy, has its own society, which publishes a stud book. In America, however, all French draft horses

are recorded by the National French Draft Horse Association in the National French Draft Horse Stud Book. This association was formed in 1876 as the National Norman Horse Association, but the name was changed in 1885, as there was no such breed of horses in France as Normans, notwithstanding the current use of the term in America. This association has published nine volumes of the stud book.

Criticisms of the French draft horse.—Because of the several types involved this breed is exceedingly variable in conformation, weight and height. The Boulonnais horse resembles the Percheron, while the Ardennais horse is more like the Belgian. The former is often criticized for its light bone and weak joints, particularly the hocks, while the latter also lacks quality in the lower legs and feet, which is often aggravated by straight pasterns and low flat heels, which frequently predispose the parts to disease. The tendons are not well detached and the bones of the legs appear round. Further, the hocks do not show as great depth and strength as desirable.

CHAPTER XVII

THE CLYDESDALE DRAFT HORSE

Because of the influence of the English-speaking people the Clydesdale draft horse is the most widely distributed of the breeds of draft horses. Notwithstanding this, in America, the breed has not met with the popularity of the Percheron and possibly of the Belgian.

The native home of the Clydesdale draft horse.—This breed was developed in southern Scotland, particularly in the county of Lanark, which has long been famous for a breed of powerful draft horses. The character of the soil and the habits of the people were important factors in the development of size and strength among the native horses. The breed takes its name from the river Clyde which flows through southern Scotland.

The origin of the Clydesdale draft horse.—There is no authentic data regarding the early origin of this breed. It is stated that there was more or less interchange of draft horse blood between Scotland and England. After the union of the crowns of England and Scotland in 1603 important trade relations sprang up between the two countries, and Scotch cattle dealers driving herds into England returned with English mares, which were bred to stallions in Scotland. Like most other breeds of horses, the Clydesdale is the result of the successful union of selected individuals from various other breeds, none of which possessed the good qualities in the same degree of efficiency as are now common among well-bred Clydesdales.

The credit for establishing the Clydesdale breed is now generally given to John Paterson, a tenant farmer of Lochlyoch, in Carmichael parish, in the county of Lanark. Between 1715 and 1720 he imported from England a black

Flemish stallion, which is said to have so greatly improved the breed in the Upper Ward as to have made it noted all over Scotland. This horse is often referred to as "Lochlyoch's Black Horse," while his get are spoken of as the most noted breed in the Upper Ward of Lanarkshire during the eighteenth century and described thus: Generally browns and blacks, with white faces and a little white on the legs; they had gray hairs in their tails, along with occasionally gray hairs on their bodies and usually a white spot on their belly, this latter being regarded as a mark of distinct purity of blood.

Early development of the Clydesdale draft horse.—For more than half a century following the introduction of "Lochlyoch's Black Horse," little is recorded of the development of the Clydesdale. About the year 1780, Scott of Brownhill, Carstairs, imported a two-year-old colt from Ayrshire known as Blaze, because of a white mark in his face. This horse is described as standing 16.1 hands high, black in color and a noted prize winner. Nothing is known of his pedigree, but from his stylish shape and fine action—qualities, he is said to have transmitted—it is generally supposed that he possessed coach blood.

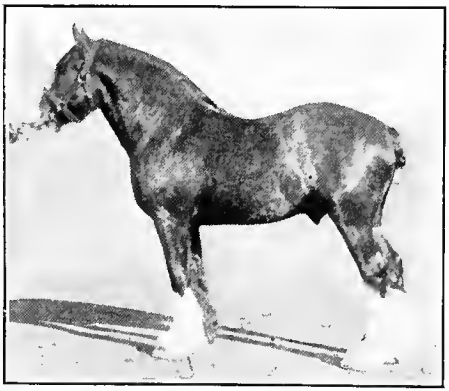

FIG. 102.—CLYDESDALE STALLION "SILVER CUP"

In 1808, a man named Somerville of Lampits Farm, purchased a two-year-old filly, with which he founded a stud. This filly was mother of Glancer (335), also known as

Thompson's Black Horse, born about 1810. This horse proved a great sire and, it is stated, from him all the best and most noted horses of the present day are descended. Little is known of the breeding of this horse, but it is thought that he was related to Lochlyoch's Black Horse. Glancer was black in color, save both hind legs, which were white. He had a strong, neat body set on short, thick legs, the clean, sharp bones which were fringed with nice flowing silken hair. He served for many years in the valley of the Clyde, between Glasgow and Lanark, and left a strong impression on the horse stock.

The breeding of good Clydesdales was given considerable impetus by the Highland Society, which very early began to hold open shows and offer premiums for horses. The prizes were divided so as to promote the breeding of both coach and draft horses. The breeders of Lanarkshire, particularly those of the Upper Ward, took much interest in these events and competition was very keen, which resulted in marked improvement of the horse stock.

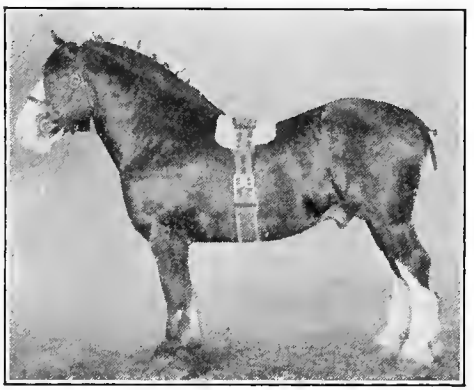

FIG. 103.—CLYDESDALE STALLION "CALIPH"

Famous Clydesdale sires.—Among the many notable stallions that have served a very important part in perfecting the Clydesdale draft horse are Bloomfield Champion (95); Clyde *alias* Glancer (153); Prince of Wales (673); Darnley (222); and Baron's Pride (9122.)

Bloomfield Champion (95).—This horse was a great grandson of Glancer (335), and was born about 1831. He was described as being a rich dark brown with forelegs black, hind pasterns white, and a narrow white streak on the face. Bloomfield Champion proved a great sire, and is sometimes referred to as "Aberdeen Champion," because he gained first prize at the Highland and Agricultural Society's Show at Aberdeen in 1834. He sired Glancer (153), Glancer (338), Bowman's Colt (1078), and a number of noted brood mares, many of which were noted show animals.

Clyde alias *Glancer* (153)..—This horse was sired by Bloomfield Champion, and was born about 1835. He was described as dark brown in color, powerfully built, and having been ruptured, was known as "The Ruptured Horse." He was a remarkable sire, as shown by the seven sons and one daughter registered in Volume I of the Scotch Clydesdale Stud Book. Many of these sons proved themselves sires of merit and great show animals. From 1844 to 1850 all of the important prizes at the Scotch horse shows went to the produce of Clyde.

Prince of Wales (673).—This horse was sired by General (322), by Sir Walter Scott (797), a great show horse and breeder, while his dam was Darling, by Logan's Twin (741). He was described as being dark brown in color with a white stripe on his face and more or less white on three legs. He possessed a slightly Roman nose and perhaps somewhat straight hocks, although he had good action. Prince of Wales was not only a great show horse, but one of the greatest breeders of sires the Clydesdale breed has produced, being credited with more offspring in Volume I of the Scotch Clydesdale Stud Book than any other sire. When 18 years old he was sold for an equivalent of $4,725 at the Merryton sale.

Darnley (222).—This horse was sired by Conqueror (199), and out of Keir Peggy (187), by Sampson (741).

Keir Peggy, the dam of ten foals and with a great show-yard career, is regarded as one of the greatest brood mares of the breed. Darnley was born in 1872, and purchased as a three-year-old by David Riddell, the owner of Prince of Wales. Darnley was successful in the show ring and famous as a sire. While Prince of Wales was a great sire of sires, Darnley was noted as a sire of dams, and both did much to improve the Clydesdale breed. Darnley's most famous sons were MacGregor (1487), Flashwood (3604), and Top Gallant (1850). MacGregor's sons did much to improve the Clydesdales of the United States and Canada.

Baron's Pride (9122).—This horse was sired by Sir Everard (5353), by Top Gallant (1850), and out of Forest Mollie (4740), by Pretender (599). He was born in 1890, and is described as brown in color with white stripe on face and white feet. Though criticized as being narrow in the chest and feminine in appearance, yet he is the most famous sire of the present time, and his 225 get, recorded in the Scotch Clydesdale Stud Book, is approximately twice as many as credited to any other sire. His noted son, Baron of Buchlyvie (11263), out of Young Maybloom (12603), by Knight Errant (4483), stands second in the list of sires, with 110 get recorded to his credit.

Baron of Buchlyvie was born in 1900 and sold as a three-year-old for an equivalent of $3,750, and in 1911 he was sold at Ayr, Scotland, for $47,500, the highest price ever paid for a horse of draft breeding. Benedict (10315), another son of Baron's pride, was a noted show animal in Scotland, and was imported to Fort Wayne, Indiana, in 1900, where he stood at the head of the Brookside Farm stud until 1904, when he was returned to Scotland. The greatest breeders and owners of Clydesdale draft horses are A. and W. Montgomery of Netherhall and Bank, Kirkcudbright, Scotland.

The Clydesdale draft horse in America.—The first importations were probably taken to Canada, because of the love of the Scotch settlers for their favorite breed. In 1842 Archibald Ward of Markham, Ontario, imported Grey Clyde (78); in 1842 R. Johnson of Scarborough, Ontario, imported Sovereign (181); in 1850 David Roundtree, Jr., of Weston, Ontario, imported Cumberland (106); in 1851 John Wilson of Oshawa, Ontario, imported George Buchanan (182); and in 1854 William Cochrane of Claremont, Ontario, imported Bay Wallace (5).

It was not until the early seventies that Clydesdales began to appear in the United States, when they were introduced from Canada and direct from Scotland. The largest importations were made in the eighties and early nineties, when many thousands of both sexes were brought to America and widely distributed. The more prominent of the early importers were: Powell Brothers, Springboro, Pennsylvania; Robert Holloway, Alexis, Illinois; N. P. Clarke, St. Cloud, Minnesota; and Brookside Farm, Fort Wayne, Indiana.

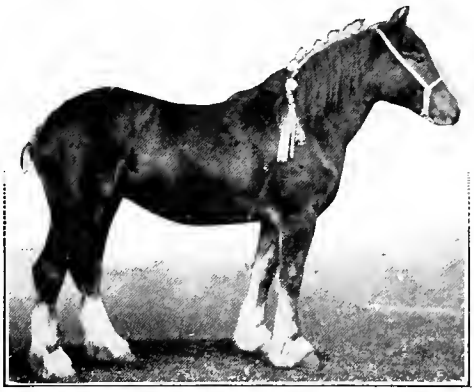

FIG. 104.—CLYDESDALE MARE "NUNAS NUMICE"

Famous American Clydesdale sires.—While the list of sires that has contributed to the improvement of this breed in our country is very long, yet the following table contains a few of the more notable ones, the date of birth, date of importation, and the sire and dam:

Name	Date of birth	Date of importation	Sire	Dam
Donald Dinnie (273)	1869	1873	Glancer (339)	Jess, by Prince Albert (1257)
Cedric (929)	1875	1881	Prince of Wales (487)	Knockdon Maggie, by Ivanhoe(916)
Glencoe (158)	1877	1881	Prince of Wales (487)	Empress (Clyde mare)
Lord Lyriedoch (4113)	1884		Lord Bantyne (2243)	Jess of Torrorie (4520)
Mac Queen (3513)	1885	1886	MacGregor (1487)	Bet of Bellemack (5506)
Lyndoch Chief (5642)	1889	1890	Lord Lyriedoch (4113)	Jess of Bloomhill (6800)
Young Mac Queen (8033)	1894		Mac Queen (3513)	Belle of the Lyons (3511)
Laminated Steel (8700)	1896		Cedric 929	Princess of Craichmore III (5601)
Benedict (9300)	1896	1899	Baron's Pride (9122)	Mary MacGregor (12864)

Famous show animals.—In recent years the exhibits of Clydesdale draft horses at the various fairs and horse shows have attracted favorable comment, and the following table gives a few of the more noted prize-winning stallions and mares at the International Live Stock Exhibition, Chicago:

Stallions	Mares
Flisk Prince, by Marmion	Princess Fortune, by Criterion
Mikado, by Marcellus	Purple Heather, by Baron Hood
King Norman, by Mucius	Lady Lustrious, by Borgue Chief
Baron Chapmanton, by Baron's Pride	Lady Effie, by McAra
Gartley Pride, by Baron's Pride	Pearl of Fairfield, by Netherlia
Dinwoodie Star, by Pacific	Harviestown Baroness, by Baron's Pride
Lord Gleniffer, by Sir Ronald	Lady Carruchan, by Gallant-Carruchan

Description of the Clydesdale draft horse.—The best type of Clydesdale calls for all the characteristics of a model draft horse. Perhaps the general appearance is not so massive as the Percheron, though the weights are approximately equal, the stallions averaging 1,700 to 2,000 pounds and the mares 1,500 to 1,800 pounds. In height the stallions average about 16.2 hands and the

mares one to two inches less, although occasionally animals of this breed are observed that will stand over 17 hands in height. The preferred color and markings are bay or brown, with a white star or blaze on the forehead or face, and with white legs up to the knees and hocks. Other colors are found, particularly blacks, grays and chestnuts. Gray is unpopular, however, and chestnut indicates English Shire blood.

The head is large with nose often slightly arched; the nostrils wide and open; the eyes bright, clear and full of vigor, yet mild; the forehead, full between the eyes, but tapering upward; and the ears of fair length and active, indicative of good disposition. The neck is of medium length and massive, slightly arched in the stallion, and also in the mare when she becomes old or in high condition. The shoulders are somewhat oblique, accompanied by high withers, thus providing conditions favorable to a free, easy and long stride.

The back is straight and broad with the ribs well sprung. Formerly shortness in the rear ribs was a common defect in the Clydesdale, making him too light in the belly and leggy in appearance, although in recent years much attention has been given to increasing the depth of the body by adding to the length of the rear ribs with a corresponding lessening of the criticism. The croup is muscular with tail well set, and the quarters especially well developed. The thighs are rounded and muscular. The set of the knees and hocks is one of the strong points of the breed. The hock is free from coarseness, suggestive of disease, with the hollows well formed. The cannons are short and flat with plenty of substance and the sinews at the back of the legs are strong and well defined. The fetlocks are large and strong and the pasterns fairly sloping.

The feet are large and occasionally too thin and flat at the heels. White feet, though common, are objectionable, being frequently, though not invariably, softer than the dark colors. They are now so prevalent among the

best horses that some authorities go so far as to say that a white foot and sock are essential in the pure Clydesdale, although there seems to be well-supported objection to both white feet and legs in southern climates where the white surface is liable to burn and blister in the sun so that the parts become swollen and painful, particularly when the horses have access to water in which they can wet the white places.

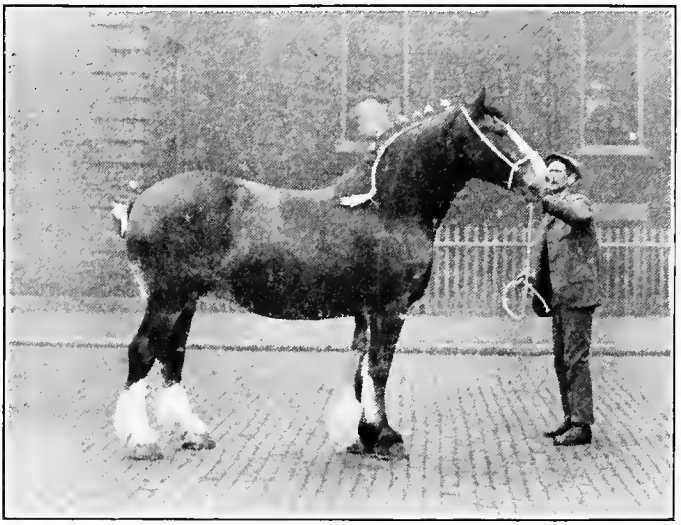

FIG. 105.—CLYDESDALE STALLION "PRIDE OF DRUMLANDRIG"

The backs of the cannons support a growth of long hair known as the "feather." In horses of best quality the hair springs from the edge of the cannon and is fine, silky and long. The statement is often made that a proper feather protects the coronet and back part of the pastern from filth and mud, and, consequently, is a preventive of scratches. At any rate, the feather when fine indicates that the other tissues, such as the bone,

skin and hair, are also of fine texture. On the other hand, when the feather is wiry and coarse, and curly, it denotes a leg that is predisposed to grease heel and scratches.

The Scottish breeders have given much consideration to the action, and as a result the Clydesdale draft horse is particularly noted for his free and snappy knee and hock action. It is stated that he surpasses all other breeds of draft horses in length of stride, and straightness and sprightliness of movement, and in the ability to keep the hock together with mechanical accuracy of motion, whether walking or trotting.

Criticisms of the Clydesdale.—Horsemen often criticize this and other "feathered" breeds because of the hairy legs which are often difficult to keep clean, dry and free from disease, particularly when the horses are obliged to work on dirt roads or under conditions in which dampness and mud are prevalent in the cooler months of the year. The tendency to straightness in the pastern is also often objectionable as is also the shortness of the rear ribs, which gives the body a rangy appearance and adds length to the legs.

Uses of the Clydesdale draft horse.—This breed is essentially a draft one, the free, straight, rapid gait and strong, heavy frame, giving it high rank among draft breeds. In addition, Clydesdale stallions are useful in crossing on common mares, the resulting offspring being excellent for farm and city work. The standing of Clydesdale grades is indicated by the $3,200 paid for four draft geldings a few years ago on the Chicago horse market. They are of good disposition and active, though often lacking weight, which emphasizes the absolute necessity of using only such stallions for crossing as have plenty of middle as well as quality and bone.

Distribution of the Clydesdale draft horse.—The adaptability of this breed has led to a wide distribution, perhaps greater than that of any other draft breed.

Besides the English-speaking countries of the United States, Canada, Australia and New Zealand, the breed has been largely imported to the Argentine Republic, Cape Colony, Sweden, Russia and Germany. In America, the Clydesdale has been most prominent in Canada, where the good effects in grading up farm mares to produce drafters serviceable for farm and city work may be seen in all the large cities. In the United States the breed has found most favor in the north central states.

Organizations and records.—In 1877 the American Clydesdale Horse Association was formed and a stud book established in which, at the present time, are recorded approximately 20,000 animals. The Scottish Clydesdale Horse Society was organized in 1878 and a stud book established of which, in 1912, there are 33 volumes recording approximately 27,500 mares and 16,000 stallions.

CHAPTER XVIII

THE SHIRE DRAFT HORSE

Although enjoying the same advantage as the Clydesdale, so far as the influence of the English-speaking people is concerned, the Shire draft horse has not met with the same degree of public favor here in America as that accorded the Clydesdale.

The native home of the Shire draft horse.—This breed was largely developed in the lowlands of east central England, particularly in the district between the Humber and the Cam rivers occupying the rich lands of Lincoln and Cambridgeshire and extending westward through the counties or shires of Huntingdon, Northampton, Leicester, Nottingham, Derby, Warwick and Stafford, on to the river Severn. The climate, soil and habits of the people all contributed to the development of horses of size and substance. During its past history the Shire or its prototype has been known in England as the Great Horse, War Horse, Cart Horse, Old English Black Horse, Giant Leicestershire, Strong Horse, and, lastly, Shire horse.

The origin of the Shire draft horse.—Exact data as to the early origin is speculative, although the Shire is considered to be a descendant of the old War Horse of Great Britain. It is stated of Cæsar that when he invaded the British Islands he was impressed with the excellency of the horses that were attached to the war chariots of the Britons. In early times, heavy active horses, being in great demand for war purposes, led to the importation of heavy horses from Flanders and Normandy. It is recorded that large importations of heavy black horses were made from Flanders, Holland and Germany as early as the eleventh century. Sir Walter Gilbey, referring to the paintings of Paul Potter, who died in 1654, states

that the strains of North German and Flanders blood were so strongly represented in our English horses of the best stamp that we need not inquire whether this horse was of German, Flemish or English origin, the character of all being practically the same. From this it would seem that the early Shire was of very mixed breeding.

In the reign of Henry VIII (1509-1547) special attention was directed to the breeding of strong horses. Laws were enacted to promote increased size and strength,

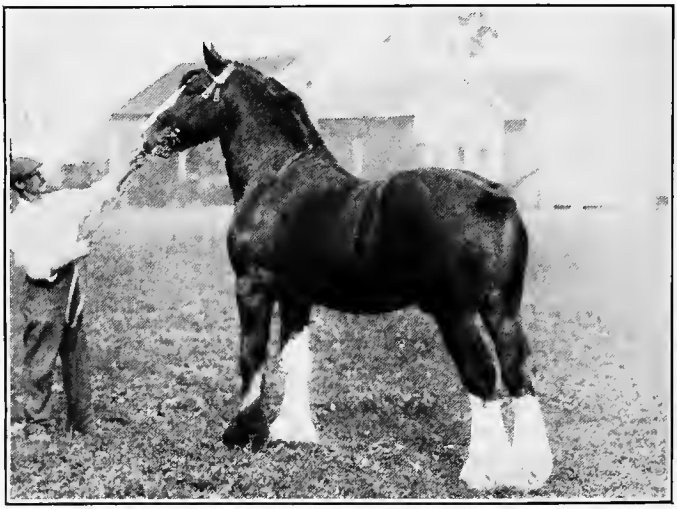

FIG. 106.—SHIRE STALLION "BLETCHLEY ROYAL DUKE"

and mares and stallions were only allowed to breed under certain restrictions. At the time this was thought necessary because of the heavy armor used by man and horse. It is stated that man's armor weighed approximately 100 pounds, the horse's 80 pounds and the spear 20 pounds, totaling 200 pounds, approximately. Adding to this the weight of a man, the war horse was obliged to support nearly 400 pounds.

Robert Bakewell improved the Shire draft horse.—Bakewell, often termed the father of improved live stock husbandry, because of his methods of breeding, was born in 1726, at Dishley Hall, near Loughborough, in Leicestershire, and died in 1795. He was one of the earliest important improvers of the Shire draft horse, though it was then known as the Leicestershire Cart Horse. His belief that the familiar maxim, "Like begets like," was not limited to a general similarity of the offspring and the parent, but extended to the minutest details of the organization, led him to adopt for his guidance a definite standard of excellence representing the form and internal qualities that were best adapted to the highest development of the horse for a specific purpose. Thus, Marshall, who lived in Bakewell's time, stated that he kept four points in view—the breed, the utility of form, the quality, and a propensity to fleshen, the three latter depending on the first.

From Holland Bakewell imported large mares and used them in systematic crossing with English stallions. A well-trained eye enabled him to detect the slightest variations from the standard and a good judgment, which was not biased by non-essential conditions or fanciful theories, enabled him to mate his animals so as to add materially to the value of the breed. Descendants of his noted stallion, Bakewell's Gee, through a grandson, Durning's Gee, of Stanley Gate, were well known in the vicinity of Liverpool for fully three-quarters of a century. The use of armor having become obsolete, on account of the invention of gunpowder, much attention was given to breeding horses for draft and farming purposes. With the improvement of the public roads and the use of coaches the draft horse came into special demand and improvement was stimulated by the liberal awarding of prizes at horse shows.

Early types of the Shire draft horse.—In the first

volume of the English Cart Horse Stud Book three types of Shires are mentioned.

First. Horses having the upper lip garnished with a long, thick mustache, considered at one time a distinguishing characteristic of the Lincolnshire horse. The color of the mustache was always black, white or a mixture of the two, and invariably corresponded with the hue of the skin from which it sprang.

Second. Horses having the lips, muzzle and eyelids destitute of hair. The skin in these places, being either bald or covered with exceeding fine down, is almost invariably flesh colored, and is sometimes marked with small dark spots and blotches. This gave rise to the terms "bald horses" and "bald-faced horses."

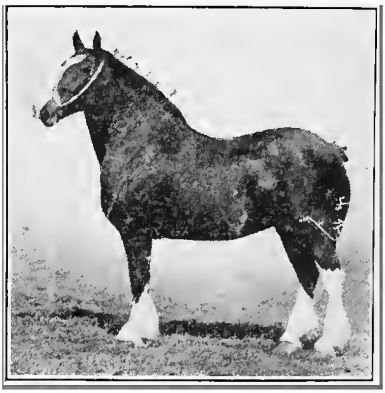

FIG. 107.—SHIRE STALLION "NARDEN LAD"

Third. Horses having a long tuft of hair growing from the front of each knee, and rarer examples also having a similar growth from the hind part of the hock, just below its joint. This is very much different from the ordinary hair on the back of the cannons and appears independent of sexual influence. This type was more frequently observed in Wales than in England.

The early Shire of the various types were large, coarse and slow. Their heads were large, ears coarse, and their lips thick; their shoulders were heavy, legs hairy and pasterns straight, and their feet were large, heels weak and the hoof of somewhat soft and spongy texture. The

rear ribs lacked depth and were so placed as to give the body an appearance of undue length and lightness.

Famous Shire sires.—Among the many notable stallions that have aided materially in the perfecting of the Shire draft horse may be mentioned Packington Blind Horse, Honest Tom, Prince William, and others.

Packington Blind Horse.—The village of Packington has the credit of possessing one of the oldest draft stallions of which we have record. This horse does not appear to have been recognized by any distinctive name, but is generally alluded to as the "Packington Blind Horse." It is assumed that he was in the vigor of life some time between the years 1755 and 1770, also that his color was black with white markings. His chief descendants, of which we have record, were bred and owned by Oldacre of Peatland Lodge, Leicestershire.

Honest Tom (1105).—This horse was sired by Thumper (2123), and out of Beauty, a noted winner of many prizes in Cambridgeshire and Norfolk and second prize brood mare at the Royal Show at Wolverhampton in 1871. Honest Tom was a bay, born in 1865, and owned for many years by T. H. Miller of Singleton Park, Lancashire, England. He won first prize each year from 1867 to 1872, at the Royal Agricultural Society shows of England, as well as at numerous others. Many of his descendants also proved noteworthy show animals.

Prince William (3956).—This horse was sired by William the Conqueror (2343), a very famous show animal, and out of Lockington Beauty, by Champion (457). He was born in 1883, and for twenty years stood at the head of Lord Wantage's stud, where he was very successful. In 1894, 52 of his offspring sold at an average of $600. Prince William died in 1905, at the age of 22 years.

Other famous sires.—While the list of notable Shire sires that have contributed to the improvement of this breed is very long, the following table contains a few of

the more notable ones, the date of birth and the sire and dam:

Name	Date of birth	Sire	Dam
Honest Tom (1062)	1806	John Bull (Fisher's)	Dam, by Robin Hood
John Bull (1169)	1839	John Bull (1160)	Dam, by Honest Tom
William the Conqueror (2343)	1862	Leicestershire (Domber's)	Dam, by William the Conqueror (2340)
Champion (440)	1867	Champion (413)	Depper, by Champion (413)
Nonpariel (1652)	1868	A I (1)	Matchless
Lincolnshire Lad II (1365)	1872	Lincolnshire Lad (1196)	Madam
Bar None (2388)	1877	Lincoln (1348)	Dam, by Great Britain (973)
Premier (2646)	1880	What's Wanted (2332)	Star, by Drayman (640)
Harold 3703	1881	Lincolnshire Lad II (1365)	Dam, by Champion (419)
Hitchen Conqueror (4458)	1883	William the Conqueror (2343)	Flower, by Honest Prince (1058)
Bury Chief Victor (11105)	1889	Prince Victor (5287)	Bury Daisy, by Chatteris Le Bon (3023)
Dunsmore Jameson (17972)	1898	Moors Zealot (15731)	Moors Bonny, by Regent II (6316)
Lockinge Forest King (18867)	1899	Lockinge Manners (16780)	The Forest Queen, by Royal Albert (1885)

The Shire draft horse in America.—No doubt Shire horses very early found their way to America, although the first authentic account is that of Tamworth, introduced from England to London, Ontario, in 1836, by the British troops, and described as a heavy artillery horse. Another, named King Alfred, is mentioned as imported in 1847. The first importations to reach the United States were in 1853, when Strickland introduced a Shire stallion from England to Aurora, Illinois, where he was known as John Bull. A few years later another stallion by the same name was imported to Bristol, Kendall county, Illinois. A man named Slyke owned another called Sampson, which traveled along the Fox River, in northern Illinois, and became very popular as a sire. The descendants of these stallions attracted favorable comment, and sold at high prices for breeding purposes.

In the first volume of the American Shire Horse Stud

Book, George E. Brown, a prominent Shire breeder at Aurora, states that as far back as he has been able to learn the earliest advertisement of Shires by any importer in western agricultural papers was in 1875. Up to this time little progress had been made, but during the eighties much improvement was obtained, although the progress of the Shire in America has not been as rapid as might be expected, considering the merits of the breed. Among the more noted of the earlier importers were: Burgess Brothers of Wenona, and George E. Brown of Aurora, Illinois; W. M. Fields & Brother of Cedar Falls, Iowa; Galbraith Brothers of Janesville, Wisconsin; Bell Brothers of Wooster, Ohio; and Powell Brothers of Springboro, Pennsylvania.

Famous show animals.—At many of the leading agricultural and horse shows the exhibits of Shires have attracted favorable comment. The following table gives a few of the more noted prize-winning stallions and mares at the International Live Stock Exhibition, Chicago:

Stallions	Mares
Royal Grey, by Kingsway	Coldham Surprise, by Normoor Statesman
Southill Castle, by Castle-Bronwick Keith	Coldham Charm, by Artillery
Dan Patch, by Wellingborough	Shelford Pride, by Childwick Majestic
Farmers Grey, by Lake Lancer	Prospect Fair Alice, by Nailston Coeur de Lion
Moulton Sergeant	Wrydeland's Sunshine, by Bury Blood Royal
Lockinge Hengist, by Lockinge Forester	Wallington Sunbeam 3d, by Phenomenon 3d

Description of the Shire draft horse.—In general characteristics this breed is similar to the Clydesdale, being perhaps a little shorter in the legs and slightly larger. This is the largest English draft breed, stallions weighing 1,800 to 2,000 pounds being of comparatively common occurrence. The height averages from 16.2 to 17 hands for stallions, with mares two inches less. The common colors are bay, brown or black, with white markings on the

face and on the legs below the knees and hocks. Other colors are occasionally observed, though uncommon.

The head is large with a tendency to a Roman face, and often lacking width between the eyes. The neck is short, well crested and muscular. The shoulders are likely to be too straight, making the action in front short and stilted, although this conformation is considered advantageous for draft. The body of the Shire is larger and deeper than that of the Clydesdale, with a stronger and more powerful appearing loin. The quarters are full and heavily muscled. The legs above the knees and hocks are well muscled and powerful, while the joints are large

FIG. 108.—SHIRE STALLION "LOCKINGE HINGIST"

and strong. The cannons are fairly full, the pasterns inclined to be straight and the feet large, with rather flat heels. The backs of the cannons support a long growth of hair, as in the Clydesdales, which should be long, fine and flowing, as this indicates quality.

Criticisms of the Shire.—As in the Clydesdale, the hairy legs are much criticized, particularly in America. The rather straight shoulders and straight, short pasterns result in lack of action. The feet are often too flat, with heels too low. Owing to the weight, criticism is often passed on the lack of quality and the sluggish temperament.

Uses of the Shire draft horse.—This breed is useful for heavy draft and for crossing on native common mares, in which capacity it is an important factor in improving our horse stock for draft purposes. This is attested by the high prices obtained for Shire grades upon our horse markets. In 1904 a Shire gelding, weighing 2,210 pounds, sold for $865, which, at that time, was the highest price reported.

Distribution of the Shire draft horse.—This breed enjoys great popularity in England, where it is first among draft horses. From England it has spread into most other English-speaking countries and to Europe and South America; particularly to Germany and Argentine Republic. In America it is most popular in the north central states, especially in Illinois, Indiana and Ohio.

Organizations and records.—The English Cart Horse Society was organized in 1878 and a stud book established. In 1884 the name of the society was changed to the Shire Horse Society, which at present has a large and influential membership. Thirty odd volumes of the stud book have appeared, recording many thousands of animals. In 1885 the American Shire Association was organized and a stud book established, of which eight volumes have been published containing a total of 12,850 pedigrees.

CHAPTER XIX

THE BELGIAN DRAFT HORSE

While but recently introduced to America, the Belgian draft horse is very popular, especially where massive drafters are demanded. At the present time, possibly, this breed ranks next to the Percheron and Standardbred in public favor (p. 434).

The native home of the Belgian draft horse.—As the name indicates, this breed is a native of Belgium. Though a small country, Belgium has a reputation as the home of draft horses extending back through several centuries. The soil and the climate, as well as the habits of the people, provide ideal conditions for the development of large horses. The Belgian people are passionately fond of horse breeding, although the farms are small and, consequently, the breeding of horses is carried on in small holdings and on a limited scale.

The origin of the Belgian draft horse.—As with many of the other breeds of horses, the real origin is obscure. It is stated that as early as the time of Cæsar, and even before, the Belgian people were great judges of horses and willing to pay high prices for superior animals. For many centuries the horses of Belgium have been in great demand, and it is stated that the greater part of the Roman cavalry consisted of Belgian horses. Certain it is that up to about the sixteenth century horse breeding was a very important industry in Belgium, but with the invention and general use of gunpowder, it seems that the horse was largely relegated to agricultural pursuits.

In the early history of the Belgian draft horse no particular animals appear to have been prominent, nor has any breeder of outstanding influence appeared. Unlike most of the other breeds of horses, the Belgian has been

almost entirely the product of its environment. Further, many, if not all, the draft breeds of Great Britain and France were greatly improved during their formative period by the use of the heavy Flemish horse, the early progenitor of the Belgian. While this country has long been famous for its ponderous horses, yet modern horse breeding, in its greatest activity, is comparatively recent.

Early types of Belgian horses.—In the early development of the breed, with each district trying to produce the highest type of draft horse, several types, more or less distinct, sprang into existence. Thus we find refer-

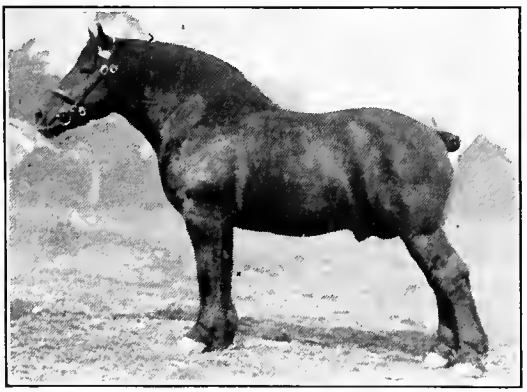

FIG. 109.—BELGIAN STALLION "MELON"

ence to the Flanders horse, the Brabancon horse, the horse of Hageland, the horse of Hesbaye, the horse of Hainaut, the horse of Condroz and the horse of Ardennais. These types have very largely disappeared, although in western Flanders horses having the characteristics of the Frisonne-Flemish are sometimes found, but they are becoming more and more rare.

The Belgian methods for improving the horse.—In 1850 interest in horse breeding was greatly stimulated

by the establishment of a government breeding stud at Tervueren. Since that date the government has given special attention to the improvement of draft horses. The sum of about 400,000 francs ($75,000) is annually expended in behalf of this work. Much of this money is awarded as prizes at horse shows, which are controlled by provincial regulations and which occur in about 50 different places. Foals, mares and stallions are each recognized, and an idea of the extent and influence may be gained by a brief review of the stallion regulations.

At each show a first and second prize is awarded to both three-year-old and aged stallions, which includes all stallions four years old and over. In the three-year-old class the first prize is 400 francs and the second 300 francs, while in the aged class the first is 550 francs and the second 400 francs. Further, the examining committee may award a maintenance bounty of 700 francs to an aged stallion that has won a first prize at a previous annual show. A similar prize of 500 francs may be awarded to an aged stallion that has won second place for two years. The committee may nominate exceptional stallions that have won bounty prizes, to compete for a grand prize of 6,000 francs, payable annually by fifths, so long as the animals remain approved. At the end of the five years the owner of such a stallion, if remaining approved, may draw an annual bounty of from 600 to 800 francs.

In order to retain the best stallions in Belgium the regulations provide that in case a stallion, which has received the 6,000 francs bounty, is sold to leave the country, the fifths already received by the owner must be returned to the state treasury. In addition to all this there are other extra prizes that may be awarded to stallions that win a first or a second prize as well as to stallions of subordinate rank. Bounties for maintenance may also be awarded to the owners of the best mares in order to retain them in the country.

The draft horse shows of Belgium are very notable events, because of the large amount of prize money awarded the horses exhibited. The annual June show at Brussels is by far the largest exhibit of one breed made in Europe. The number of entries often runs well up toward 1,000, with hundreds of stables represented from all parts of Belgium, although the provinces of Liege, Namur, Brabant and Hainaut contribute the more famous horses. In addition to the annual show at Brussels many agricultural associations also hold fairs in Belgium, at which local horses are exhibited. These serve to stimulate interest among the small owners.

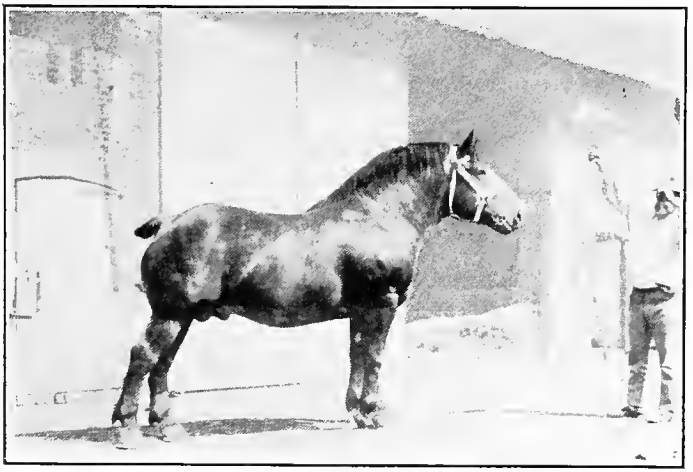

FIG. 110.—BELGIAN STALLION "LEOPARD"

The Belgian draft horse in America.—The first authentic importation of horses from Belgium to America was in 1866 when A. G. Van Hoorebeke introduced them to Monmouth, Illinois. These horses were designated as Boulonnais at first, but a few years later were given the correct name of Belgians. There were but few importa-

tions until the eighties, when they were brought over in large numbers. The following are among the more noted early importers: The Wabash Importing company of Wabash, Indiana; D. P. Stubbs & Sons of Fairfield, Iowa; Nicholas Massion of Mintonk, Illinois. The following names are the more common among the recent importers: A. B. Holbert of Greeley, and Lefebure & Sons of Fairfax, Iowa; J. Crouch & Son of Lafayette, Indiana; McLaughlin Bros. of Columbus, Ohio; Dunhams of Wayne, Illinois; and H. A. Briggs of Wisconsin.

While many stallions have been brought over only a few mares have been imported. In the past this may have been due, in part at least, to the fact that there was not the demand for Belgians to encourage importing and breeding, as the trade was better satisfied with the Percherons and some of the English draft breeds, although at present this condition cannot be said to exist. Another factor that is serving to keep the Belgian mares at home is the high price asked for them in Belgium.

Growing popularity of the Belgian.—In the past decade this breed has received very favorable comment among breeders and consumers of heavy draft horses. This is forcibly illustrated by the high prices obtained in the horse market for Belgian grades as well as by the many attractive exhibits shown at the various fairs and horse shows. This growing popularity is due to the size, strength and endurance as well as to the action possessed by Belgians of quality. The conformation and color are attractive, the legs clean and free from long hairs, which adds to the popularity.

Famous show animals.—Since the World's Fair at St. Louis in 1904, the Belgians, particularly the stallions, have made a strong public impression at the show ring. While the list of prize winners is very long, the following table contains a few of the more important stallions and mares that have won at the International Live Stock Exposition, Chicago:

Stallions	Mares
Mon Gros, by Champetre de Labian	Betsy de Voorde, by Volcan de Cortie
Mador-de-B-C, by Bacchus	Lucie de Ostende by Bienfoit de Ronquieres
Bonaparte de Boulant, by Reve d'Or	Catherina, by Nickle
Chauteur, by Ideal du Fosteau	Soupette, by Parfait de Mar
Richelieu, by Apollon	Diana du Kat, by Grand Duc du Fosteau
Coco, by Coquet	Margarine, by Duc de Chenoy
Cyclone, by Marquis de Kleuyem	Eliza, by Avenir de Bruges

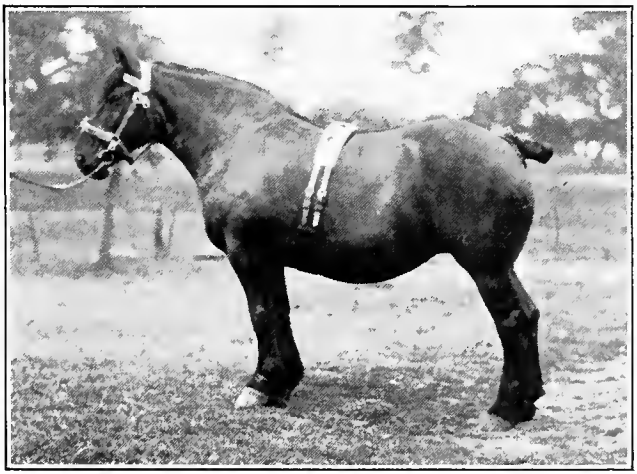

FIG. 111.—BELGIAN MARE "BELLA"

Description of the Belgian draft horse.—This breed is one of the most compact in form of any of the draft breeds in America, possessing a maximum of weight within a given space. The weight and height are variable, stallions from Flanders weighing about 2,000 pounds and averaging 16.2 to 17 hands high; stallions from Brabant weighing about 1,600 pounds and averaging 15.3 to 16.3 hands high; while stallions from Ardennais weigh only about 1,200 to 1,500 pounds and average 15 to 15.3 hands high. The common color is chestnut, although

bay, brown and roan are frequently found. Grays are not in favor and not often found. The Belgian is much praised for his superior temperament. This kind disposition is due, in part at least, to the fact that the breed has been developed on small farms, so that the horses were in close relationship with the everyday life of the people.

The head is of good size, face straight, nostrils large, but eyes rather small and not very prominent. The ears are small, set wide apart and generally well carried. The neck is short, very thick and well crested. The shoulders are upright, strong and heavily muscled. The chest is deep and wide, giving a very large girth. The ribs are long, well sprung and closely coupled at the loin, giving a better body than is found in any other breed of draft horses.

The back is short and very broad, but is often inclined to sway more than is desired. The rump is short, very wide and muscular, but is inclined to be steep with the tail attached low, although well carried. In fact the head, neck and rump suggest the French breeds in general appearance. The quarters and thighs are heavily muscled. The hocks are rounded, lacking definition, and the legs, though short and devoid of long hair, are rather thick, and the tendons and bones lack definition. The pasterns are often rather short and straight, which, in connection with hoofs inclined to be straight, give a rather short and stilted action, although good action is claimed for the better specimens.

Criticisms of the Belgian.—American breeders state that the conformation and quality of the legs are not all that could be expected. Often the bones of the legs lack sufficient substance to support the body weight and withstand the severest of labor. It is also stated that the rather straight pasterns and feet often predispose the lower legs to disease, which is aggravated all the more by narrow and high heels. Frequently the hocks do not

show as great depth and strength as is desirable. Among a few breeders the back is often criticized for a slight tendency to sag, giving a sway-back appearance.

Uses of the Belgian draft horse.—The short, stocky legs and low-set, blocky body make this breed very useful for slow, heavy hauling over city streets, thus it ranks high for heavy draft over smooth roads. The Belgian draft horse is especially adapted for crossing on common mares, lacking in weight and substance for the production of heavy draft horses. This cross is particularly successful when grade Clydesdale mares are used, as it gives an increased depth of body with a corresponding shortening of the legs, and a general massiveness of form not easily secured by the use of any other breed of draft stallions. Such animals command a fancy price in the horse market.

FIG. 112.—BELGIAN MARE "GAMINE"

Distribution of the Belgian draft horse.—In recent years this breed has enjoyed a widespread distribution because of its desirability for the heaviest kind of work. Large numbers have been taken to Germany, France, Holland, Sweden, Austria and other European countries; to Argentine Republic and other South American countries as well as to both the United States and Canada. In the United States, the Belgian has been longest known, and the largest number are found in Iowa, Illinois, Indiana and Ohio, although in recent years it has been distributed wherever heavy draft horses are needed.

Organizations and records.—In 1886 the National Draft Horse Society of Belgium (Le Cheval de Trait Belge) was founded and a stud book established. This society is very aggressive, having a very large membership. It receives an annual grant of 30,000 francs ($5,000) from the government to promote horse breeding. Up to 1909 the stud book consisted of 17 volumes, recording 52,134 stallions and 66,633 mares. In 1887 the American Association of Importers and Breeders of Belgian Draft Horses was organized and a stud book established. While this association has worked in complete harmony with the one in Belgium, it has not been nearly so effective. In 1911 three volumes of the stud book had been published recording 4,700 stallions and 1,440 mares.

CHAPTER XX

THE SUFFOLK DRAFT HORSE

Of the six major breeds of draft horses in America, the Suffolk was the last to be introduced, and is, perhaps, the least known, although the breed as such is one of the oldest of the draft type.

The native home of the Suffolk draft horse.—This breed was largely developed in the eastern part of England, especially in Suffolk county, which has long been

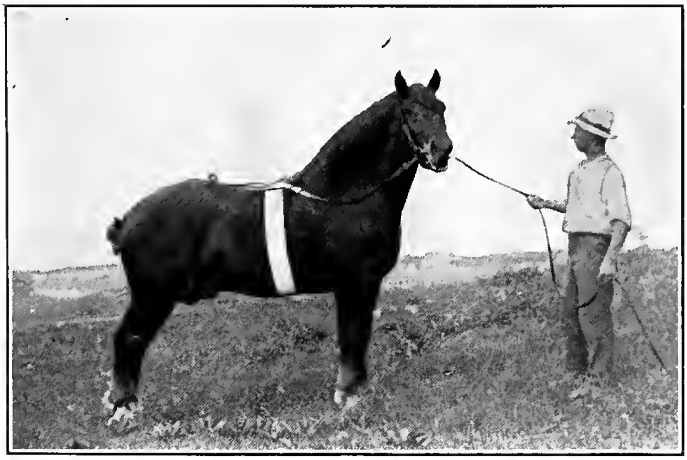

FIG. 113.—SUFFOLK STALLION

noted for the general excellence of its heavy horses. This county comprises about 1,500 square miles. The soil is fertile, providing nutritious pastures and suitable for the development of heavy horses. Another important factor is the habits of the people, who possess a natural love for the breeding of horses, a characteristic of all Britons.

The early origin of the Suffolk draft horse.—While exact authentic data is wanting, it is believed that, in purity of blood this breed surpasses any other breed in Great Britain. As early as 1700 much attention was given to improving the native horses of Suffolk and Essex counties by better care and management. For almost a century there is no reliable data of the introduction of foreign blood. While it is sometimes stated that horses from Normandy played an important part in the formation of the breed, no positive information exists on this point, and the evidence indicates that there was little or no admixture of outside blood until well toward the close of the eighteenth century.

Crisp's Horse of Ufford (404), the Suffolk foundation.—All pedigrees of the breed that are recorded in the stud book of either England or America trace to the Crisp Horse (404). He was owned by T. Crisp of Ufford, Sussex; was born in 1768, and by an unknown sire. He stood 15.2 hands high, was of a light chestnut color and active. The Crisp Horse proved a remarkable breeder, as is shown by a tabulation in the first volume of the Suffolk Horse Stud Book, which includes over 700 of his descendants in 15 generations, the first five of which cover a period of almost thirty years and brings the horses to the starting point of the pedigrees of Suffolk horses, as recorded in the stud book, though little is known of the dams previous to this time. The Crisp Horse is the sire of five recorded offspring, but his line is represented through Glud's Horse (587), born about 1775 and died at Laxfield in 1783. He stood about 16 hands high, of a beautiful chestnut color and was well boned and free from blemishes.

Smith's Horse (1110), born in 1799, and a great grandson of Glud's Horse (587), is the next most noted animal in the Crisp Horse's descent and the one through which all of our present-day Suffolks trace. He is described as a choice specimen of the breed in his day,

and was the sire of two famous stallions, Brady's Briton (198), born in 1809, and Julian's Old Boxer (755), born in 1805. From this point the descendants of the Crisp Horse become very numerous. Mention should be made, however, of Crisp's Cupbearer (416), as he is the sire of 39 of the more than 700 descendants of the Crisp Horse tabulated in Volume I of the stud book. He was born in 1864, of a dark chestnut color, and is described as a large horse with a grand fore end, great depth of girth, and splendid muscular shoulders, but plain behind. He and his sons were famous show animals in their day.

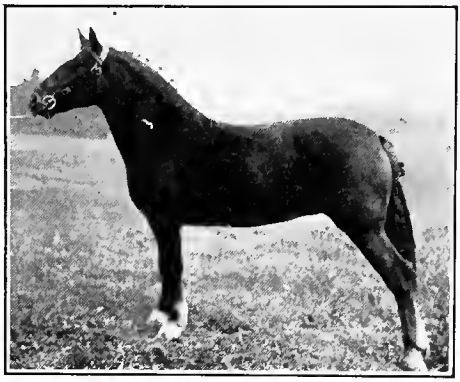

FIG. 114.—SUFFOLK MARE

Foreign tribes introduced.—That foreign blood was introduced to Suffolk county to improve the native horse stock is now well known. This introduction, however, did not take place until nearly a century after the early origin of the Suffolk breed. There were, at least, three tribes introduced; namely, the Blake tribe, the Wright tribe, and the Shadingfield tribe.

The Blake tribe.—This tribe had its origin in a horse named Blake's Farmer (174), born about 1760, and introduced from Lincolnshire to Suffolk in 1764, by a man from whom the horse takes his name. Nothing is known of this animal's ancestors, as it is thought the advertised pedigree, given him when imported, was incorrect. He is described as a trotting stallion and chestnut in color. His noted son, Blake's Everett (173), was born in 1778,

who in turn sired Blake's Old Briton (171), perhaps the most noted sire of the Blake tribe. He was born in 1784, and is described as standing 16 hands high, remarkably short legged, full of bone, and chestnut in color. His noted son, Blake's Young Briton (172), born in 1796, sired Spink's Suffolk Farmer (1127), born in 1802, both of which were very notable sires of the tribe.

The Wright tribe.—This tribe originated from a horse introduced from Lincolnshire known as Wright's Farmer's Glory (1396), or the Attleboro horse. He was born about 1796, though nothing is known of his parentage. He is described as chestnut in color and not a trotting horse, but having more size, and perhaps may have been a half-bred Suffolk. He sired several notable sons, the most famous being Adam Hawes' Farmer (674), born in 1803. This horse in turn sired Pattle's Gye (939), born in 1810, and who was the grandsire of Nunn's Boxer (913), perhaps the greatest sire of the Wright tribe. This horse is described as red chestnut and very stylish, though small.

The Shadingfield tribe.—This tribe takes its early origin from a horse named Barber's Proctor (58), born in 1793, and said to have been sired by a Thoroughbred. He was bay in color and perhaps the greatest sire of the Shadingfield tribe. In describing the animals of this tribe the Suffolk Stud Book states they were thin in the shoulder and light of bone below the hock, but were hard-fleshed, wiry, active horses, with long, lean heads, and that the mares of the tribe are more or less given to breed back to their bay ancestors.

These tribes were all introduced to improve the breed, and each was popular for a time, but they presented deficiencies along with the desirable qualities. They all were submerged into the Suffolk, as they could not overcome the breed characteristics.

Modern Suffolk draft horse.—The present-day perfection of this breed is due to the efforts of the farmers in

Suffolk and vicinity generally. All introductions have long since ceased, but those remarkable features of short legs, rounded bodies and longevity, with vitality, are still the well-known characteristics of the Suffolk horse.

The Suffolk draft horse in America.—Although this breed was first introduced to the United States in 1880 by Powell Brothers of Springboro, Pennsylvania, yet progress has been slow, only a few having been imported. In 1888 Galbraith Brothers of Janesville, Wisconsin, made their first importation of stallions, and during the same year Peter Hopley & Company of Lewis, Iowa, introduced the first mares, and these parties have since been the leading exponents of the breed in this country. A few scattering importations have been made from time to time, the largest in 1903, when 41 were brought over.

During recent years the Suffolks have increased in popularity somewhat, and at the present time there are several breeders in this country the more important of whom are Peter Hopley & Son of Lewis, Iowa; Samuel Insull of Libertyville, Illinois; O. C. Barber of Barberton, Ohio; C. A. Hamilton of Loveland, Colorado; and William Anson of Christoval, Texas.

Show animals.—In recent years there have been several creditable exhibits of Suffolks at the various live stock shows. At the 1911 International Live Stock Exposition at Chicago the stallions Westside Chieftain, by Ormonde, and Ashmoor Luther, by Rendlesham Captain Gray, as well as the mares Sudbourne Ruby, by Golden Grain, and Ruby, by Bowdsey Harvester, attracted favorable comment.

Description of the Suffolk draft horse.—This breed is not so large as the other major draft breeds, the average weight running from 1,600 to 2,000 pounds, and the average height 16 to 16.2 hands. In general type, however, it is as low set, short legged, deep bodied and muscular as any of the draft breeds, if, indeed, it does not excel all others, with the possible exception of the Belgian. The

color is exceptionally uniform, and it is generally some shade of chestnut, as the breeders have adhered almost from the beginning to this color.

The head is of medium size, clean cut, with small ears, full forehead and a nose that tends to Roman form, which has been rather characteristic of the breed. The jaws are strong, with cheeks deep and full. The neck is short and

FIG. 115.—SUFFOLK STALLION

full. It is often arched, particularly in the case of stallions, and sometimes joins the head a bit heavy or thick, but at the shoulders, as a rule, it is well connected. The shoulders are of good length and powerfully supported. The body of the Suffolk is one of its notable features; the chest is deep and wide; the ribs are well sprung and deep, especially near the flank, giving a short-coupled and compact barrel. This undoubtedly contributes to the strength of the statement that the Suffolk is an easy keeper and possessed of unusual endurance. The rump

is broad, the tail well set and the quarters deep and powerfully muscled. The heavy muscling of the legs above the knees and hocks is one of the special features of the breed. The lower legs are devoid of long hair, and are clean cut and cordy. The feet are of good size and in good individuals are dense and elastic.

FIG. 116.—SUFFOLK STALLION

The action is free and easy, notwithstanding the massive conformation, which, in connection with the somewhat lighter weight, easy keeping and docile disposition, particularly adapts the Suffolk for farm work and for light draft, where a certain amount of weight may be sacrificed for activity and durability. Pulling contests at an early time were common among Suffolk breeds and this, no doubt, did much to improve the muscling, the general quality and the action.

Criticisms of the Suffolk.—The seeming lightness of limb, compared with the depth and weight of body, as well as fullness of the neck, has given the Suffolk the appearance of lacking the proper proportion of such parts. It is stated that one or two of the early strains were troubled with weak or bent hocks, a criticism often heard at the present time. Formerly it was stated that the feet were flat and the hoofs brittle, and such remarks are often passed at the present day.

Uses of the Suffolk draft horse.—This breed ranks high as a medium draft horse, because of its free action and endurance. It finds its true place on the farm and at rapid, rather light draft work. Its value in crossing has not been fully tested, principally because of the few Suffolk stallions available, although it is stated that when crossed on common mares the resulting offspring make high-class animals for heavy farming and express-wagon work.

Distribution of the Suffolk draft horse.—Although this breed has not found favor in America it is extremely widespread, having been exported to France, Germany, Spain, Austria, Sweden and Russia in Europe; to South Africa and the Nile region; to Australia; to New Zealand; and to Argentine Republic in South America. While there are but few in America, they are scattered throughout many states and Canada. The breeders report an increasing interest in the breed.

Organizations and records—In 1877 the Suffolk Stud Book Association was organized and the first volume of the Suffolk Stud Book appeared in 1880, which, in addition to the pedigrees of some 2,500 animals, contains the most authentic early history of the breed. In 1911, 17 volumes had appeared, containing the pedigrees of 3,744 stallions and 6,755 mares. A few years ago the American Suffolk Horse Association was organized and a stud book established, of which two volumes have appeared containing the pedigrees of 622 animals.

CHAPTER XXI

PONIES

Formerly the dividing line between the horse and the pony was vague and undefined, but in 1883 the Hackney Horse Society of England designated all animals measuring 14 hands or under as ponies, and registered them in a separate part of the stud book. This height was accepted as the standard by the leading horse show societies in England and America. Later the standard height of polo ponies was increased to 14.2 hands, and in 1905 the American Hackney Society increased the height of Hackney ponies to 14 hands and 1 inch.

The Shetland pony.—Because of its intelligence and docile disposition the Shetland is the more popular of the imported ponies. He is useful for pleasure driving, especially for children.

The native home of the Shetland pony.—This breed of ponies was developed on the Shetland Islands, which are situated about 200 miles north of Scotland. There are about 120 of these islands, comprising a total area of about 500 square miles. They are rocky, barren and cold. Not more than fifteen of the islands are inhabited, the principal one being Mainland, on which is located Lerwick, the largest port and a town of less than 4,000 people. In addition to Mainland, Fetlar, Bressay, Fair Isle, Yell and Unst also take an active interest in breeding ponies.

The history of the Shetland pony.—The early ancestry of this breed of ponies is not known. When ponies were first introduced to the islands is not a matter of record, but they have been bred there for centuries. Perhaps they are more or less related to the ponies of the British Islands, or of Iceland and Scandinavia. As with most

other breeds of horses, the Shetland pony owes its present perfection to its environment. Scant forage, oftentimes entire lack of grain, and a cold climate, are responsible for the diminutive form.

The improvement of the Shetland pony began in 1873 when the Marquis of Londonderry took an active interest in the breed. He purchased the Island of Noss and a part of Bressay on which he maintained large studs. He had a stud at Seaham Harbor, on the northeast coast of England.

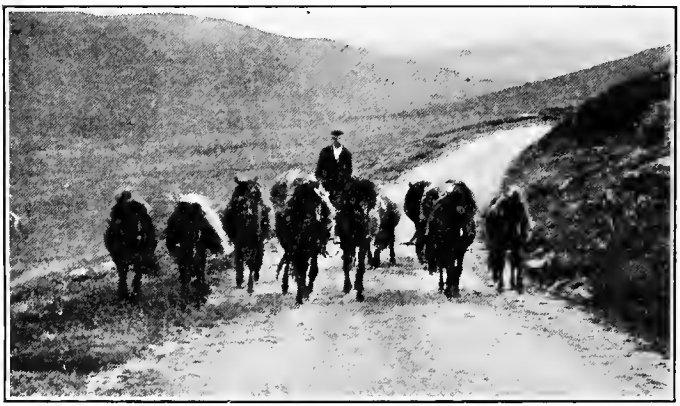

FIG. 117.—SHETLAND PONIES AT HOME. LERWICK, SHETLAND ISLANDS

In 1891 the government returns gave the number of ponies on the islands as 4,803, but because of the demand in recent years the ponies are steadily decreasing. S. B. Elliot, who toured the islands in 1906, made a careful estimate of the number of ponies, and could not account for over 4,000 of all ages and sexes. Further, he estimates the number of foals produced annually at 400.

The Shetland pony in America.—The history of this breed of ponies in America is comparatively brief, as but few are found, although the first importations occurred more than 25 years ago. While in their native home they

are the horse-of-all-work, yet in America their use is limited nearly exclusively to children, whom they serve very well, being even tempered, intelligent and active.

In 1888 the American Shetland Pony Club was organized and a stud book established. In 1911 eight volumes had appeared, recording about 8,000 ponies. The Shetland Pony Stud Book Society is the official organ of the breed in Scotland and on the Shetland Islands.

Description of the Shetland pony.—The limit of height

FIG. 118.—SHETLAND PONY "VESPA OF BELLE MEADE"

established by the Shetland Pony Stud Book Society is 10 hands and 2 inches. Ponies over this height cannot be registered, although in America the Shetland Pony Club has increased the height to 11 hands and 2 inches. The size is more or less the result of feeding, but the weight on the average should approximate 300 to 400 pounds.

The type of the Shetland is usually that of a small draft horse, although many are seen that have fine bone and slender bodies similar to the trotting type. In fact, the type varies somewhat on the different islands. The common colors are brown, black and bay, but other colors, such as dun, chestnut and gray, are often found. Piebalds are not considered desirable, though there is a demand for broken colors in America. A long, heavy coat of hair occurs on the body in cold weather. When shed, however, the coat is fine and glossy and the animal is much more active in his movements. The foretop, mane, and tail are heavy and long, and add much to the attractiveness of a well-kept pony.

The Welsh pony.—This breed of ponies was largely developed in Wales and in the borders of the adjoining counties. The country is very hilly and contains much waste land, which provides very scant pasturage. The horses raised in such environment develop quality and endurance and become very sure-footed, but, of course, lack in size. This breed of ponies has been improved from time to time by the introduction of superior blood, chiefly Thoroughbred, Arabian and Hackney. It is stated that the Welsh pony is more numerous than any other breed of ponies on the British Islands; the exact number is not known, as there are no statistics on the subject.

The Welsh Pony and Cob Society is the association interested in the improvement of the breed. This society has its headquarters at Greenfield, Penybout, Radnorshire, Wales. At present there is no society in America.

Description of the Welsh pony.—The ponies of Wales vary so widely in conformation, height and weight that even in their native country they are not altogether regarded as a breed. In general, however, they have a neat head, good shoulders, strong back, well-muscled quarters, and the best of legs and feet. The Welsh Pony and Cob Society divides the ponies into four classes, depending largely on the height and form. In the first class the

height does not exceed 12.2 hands, with any color permissible. This class is found in the more hilly sections, and has superior bone, muscle and endurance. In type it resembles the Arabian, possessing much the same carriage of head, neck and tail. In the second class the height ranges from 12.2 to 13.2 hands, but the type is more cobby in general appearance. This class lacks the action of the former and is not so well adapted to mountain lands. In the third class the height ranges from 13.2 to 14.2 hands, and the type is even more blocky than the second class. In fact, this class would rank as a cob. In

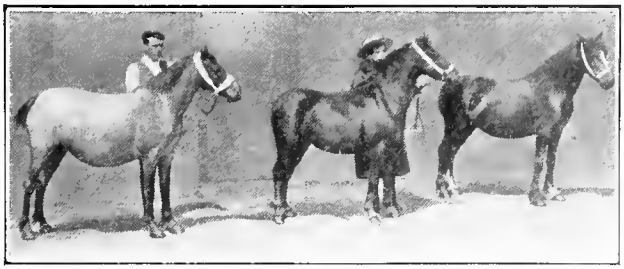

FIG. 119.—WELSH PONIES "QUEEN BEE" AND HER COLTS

the fourth class the height ranges from 14.2 to 15.2 hands and the animals are described as being suitable for mounted infantry and cavalry service.

The Welsh pony in America.—While these ponies have been used in America for many years, they are comparatively few in number, although during recent years they have increased in popularity. The Welsh pony possesses more size, style and action than the Shetland, and is suited to either saddle or harness. The smaller strains are useful principally for children; larger ones, because of their general activity and endurance, find favor for polo playing.

The Exmoor pony.—This breed of ponies was developed on the moors of southwestern England, in Devonshire. The early origin is not known, but the Exmoor pony has been bred more or less wild for many centuries.

This breed has been classed as the highest type of pony. It has no doubt been greatly improved by the Arabian horse, which it closely resembles in conformation, as well as by the Thoroughbred. The improved form meets with favor as a saddler and in harness. Because of their activity and endurance they are useful in polo playing. There are but few Exmoor ponies in America.

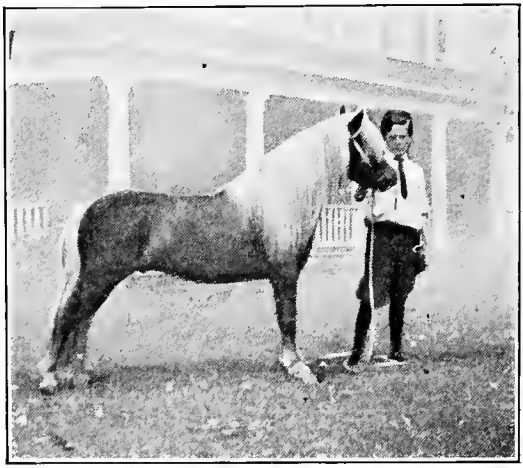

FIG. 120.—PONY SHOWING STYLE AND FINISH

The Polo Pony Society Stud Book contains a description of the Exmoor pony in which the average height is given as 12 hands, but W. C. Kerr, in his description, gives the height as 13 to 14 hands. The color is usually bay or brown, with black points. The head is neat and well carried, the forehead is broad, the nostrils large, the eyes clear and the ears pointed. The shoulders are long and sloping, the back short and powerful and the legs short, possessing good bone. The Exmoor pony has great endurance and is surefooted.

The New Forest pony.—This breed of ponies originated in southern England in the county of Hampshire, the

greater part of which is unclaimed and waste land. As with the other breeds of ponies, the early origin is not known, but certain it is that they have been bred in a more or less wild state for many generations. It is stated that there are about 2,500 of these ponies. Like the other breeds of British ponies, the New Forest has been much improved in recent years. The breed owes much of its present perfection to Lord Arthur Cecil, who it is stated turns out with his mares 30 to 40 good stallions each year. Many of these stallions come from the Island of Rum, purchased by Lord Arthur in 1888. No doubt much of the recent improvement has been due to Arabian and Thoroughbred blood.

The Polo Pony Society Stud Book gives the average height as 12 to 13 hands. Most of the Rum ponies are black, although some are bay or brown. These New Forest ponies are generally more spirited than most of the other British ponies. They have good shoulders, strong backs and excellent quarters, although sometimes criticized for being low at the withers and possessing a droopy rump and cow-hocked. Like all ponies that have been developed on scant nutrition, they improve under good management.

A few years ago the New Forest Pony Association was organized to look after the interest of the breed in England. This breed has no organization in America.

The Dartmoor pony.—This breed of ponies had its origin in Dartmoor, an extensive tract of land in Cornwall, embracing about 325 square miles. Here ponies have been bred in a half-wild state for many generations, although in recent years they have been much improved by crossing with Arabian and Thoroughbred stallions. Dartmoor ponies are comparatively few in England and there are practically none in America.

The Dartmoor pony is described as never exceeding 13 hands in height. The official description states that if the height exceeds 14 hands it suggests cross-breeding.

The color is usually brown, black or bay, although an occasional gray will be found. In recent years efforts have been made to improve the Dartmoor by the introduction of good stallions of the best pony breeds.

The Irish pony.—As the name suggests, this breed of ponies was developed in Ireland, particularly in Galway county, where ponies have been bred in a semi-wild state for generations. Like other breeds that run practically wild in a hilly country, it is hardy, active and sure-footed. It has been much improved by the use of Barb, Arab and Thoroughbred blood and in its present form stands 12 to 14 hands high, sometimes more. The color is usually black, brown or bay, but chestnuts are often found. The Irish pony has a thick, shaggy coat of hair.

The polo pony.—The increasing popularity of polo is attracting much attention to ponies suitable for playing this game. The polo pony is really not a pony, but a small horse. He does not necessarily belong to any distinct breed, and is generally a cross. For this purpose any horse possessing the necessary speed, activity, endurance and intelligence will do. He must be able to carry 160 to 200 pounds weight, make incessant turns, twists and stops at full speed, and make short spurts at the rapid gallop. The maximum height allowed by the American Polo Association is 14.2 hands. Small Thoroughbreds, western ponies and cross breds are popular. Breeding polo ponies, however, is somewhat of an experiment and presents many difficulties, the chief one being the limit of height, and the training.

Other ponies.—While the above breeds of ponies are more commonly known in America, yet distinct types of ponies are found in almost every country. Thus we have the Mongolian, Japanese, Korean, Burmese and Manipuri pony; the Sumatra and Java pony; and the Russian, Scandinavian or Norwegian pony. Adverse climatic conditions, promiscuous breeding and privation have had much to do with the development of most of these ponies.

CHAPTER XXII

AMERICAN HORSES

At the time of the Spanish conquest there were no horses, either wild or domesticated in any part of America. This seems astonishing considering the predominance of the prehistoric horse, especially since the soil and climate are very favorable to the horse, as is evidenced by the thousands now roaming the plains of both North and South America.

In this connection it should be stated that worthy evidence exists which some authorities state favors the assumption that herds of wild horses roamed over the pampas of South America, before latter-day communication had begun between Europe and the New World. In 1527, when Cabot discovered the east coast of South America, it is stated that he found drawings representing the horse, and in his description of the upper reaches of the La Plata river, the horse is given with other animals which are known to have existed in that region. It is possible, therefore, that native horses ranged the plains now included in the territory of Argentine Republic and of Paraguay. Possibly these wild horses entered into the ancestry of the present stock. This is problematical, for certain it is the Indians of North America knew nothing of the horse previous to his acquaintance with the white man.

Early importations of horses to America.—There are but few records of early importations of horses to America, although no doubt many found their way to the New World along with the first settlers. The first importation was made by Columbus in 1493, but these all perished. The next importation of which we have record was in 1519, when Cortez landed 16 horses in Mexico.

Possibly the feral horse of Mexico owes his origin to this importation. The next importation of which we have knowledge was in 1527, when De Vaca landed forty-two head in Florida. Possibly the feral horse of eastern United States owes his origin, in part at least, to the 1527 importation. During this same year horses were landed in South America. Another noteworthy importation occurred in 1540, when De Soto made his discoveries in the Mississippi valley. Possibly this importation added to the feral horses in southwestern United States.

Colonial horse-breeding centers.—The early improvement of American horses was especially favored about certain centers, though, of course, more or less interest was taken in horse breeding wherever the white man settled, as the horse proved a very useful beast of burden in the new country. The principal centers were Virginia, New York, New England and Canada. The characteristics of the horses, developed about each of these centers, were modified to a more or less extent by the habits of the people.

The colonial horse of Virginia.—The first authentic importation to this colony occurred in 1609, when six mares and two stallions were brought from England. In 1611, it is reported that 17 mares and horses were introduced along with other live stock. A third importation occurred in 1614, but the number landed is not given. In 1619, the Virginia company imported four mares, and in 1620 this same company ordered 20 mares to be sent over at a cost, delivered, of £15 each. Many other importations followed.

The early settlers of Virginia and the Carolinas were the cavaliers of old England. They were men who loved the horse. Long military training had taught many of them that a man well horsed had his battles half won. It is natural, therefore, on coming to the conquest of a new land, the men who had been mounted in their own land upon horses capable of carrying them at great speed

and of maintaining such speed under difficulties for a great length of time, should want animals of such character to be their companions in the new country. Racing was the popular sport from the beginning, thus a type of horse was developed patterned after the English Thoroughbred. The height is given as ranging from 12 to 15 hands; the carriage as lithe and active and the quality as unexcelled, as indicated by a clean-cut form, and clean legs with dense bone and detached tendons. Horses of this type later found their way north to New York and

FIG. 121.—AMERICAN SADDLER "CARROLL PRESTON"

west to Kentucky, where they played an important part in the development of the American trotter, American saddler and the Thoroughbred.

The colonial horse of New York.—The first authentic importation to New Amsterdam, as New York was then called, occurred about 1629, when several horses were introduced from Holland. There is a lack of definite information regarding other early importations until the middle of the century, though many horses were introduced, as they had become numerous.

The early settlers of New Amsterdam were from Holland. They did their riding upon cumbersome animals more calculated to carry great burdens slowly than lighter ones with vim and dash. The Dutch settlers, therefore, introduced from Holland the ponderous animal of burden, rather than the prancing steed for which the Virginians were noted, thus a type of horse developed patterned somewhat after the drafter, although much lighter in weight. This type became known as the Conestoga. This comparatively light draft horse, bred primarily for freighting heavy merchandise across the mountains and over the primitive roads, was well adapted to the pioneer's farm, where such work required patience, strength and hardiness. Horses of this type soon spread into Pennsylvania and westward, where they formed the blood of the mare stock that produced our grade draft horses.

The colonial horse of New England.—In 1629 the London founders of the Massachusetts Bay plantation landed 25 head of mares and stallions at Boston harbor. During this same year six mares and one stallion were landed at Salem. Several other shipments followed, but nothing worth special mention until 1635, when two Dutch ships arrived at Salem with 27 mares and three stallions. These were followed by numerous importations.

The Puritan who settled New England was not a man for display. He was given to humility and to simple drudgeries, denying himself all indulgences. He was sturdy and reliant, asking the horse to share his burdens, thus a type of horse developed noted particularly for general utility. This type was larger than the Virginian, more muscular and with greater weight of bone, but not the equal of the Conestoga in either size or strength. This type was spread through all New England, where it was perfectly adapted to conditions. It played an important part in the formation of the Morgan strain of horses, which, in turn, entered into the develop-

ment of both the American trotter and the American saddler.

The early Canadian horse.—While it seems certain that horses were introduced from France to Port Royal as early as 1609, yet this settlement played no part in the distribution of the Canadian horse. The next notable authentic importation did not occur until after the middle of the century, when Marquis de Tracy arrived at

FIG. 122.—STANDARDBRED STALLION "GAY AUDOBON"

Quebec with his expedition including a large number of horses. Other large shipments followed.

Since the St. Lawrence region was largely settled by the French, who were at that time breeding medium weight horses, we find them developing a type of semi-draft horses in Canada, although later many light horses were introduced, so that the region became famous for two types of horses, one fashioned after the Thoroughbred, the other after the drafter, though lacking the pon-

derous size of the present day draft horse. It is worthy mention that in the acclimation the Thoroughbred lost some of his speed as well as the drafter his size, but both gained in hardiness and endurance. Because of the speed and endurance the light type became widespread, many of the horses finding their way to New York and Kentucky, where they entered into the formation of the American trotter and the American saddler.

While the eastern colonies and the eastern central and southern states were being settled and populated, the horses that had escaped from the Cortez expedition of 1519 in Mexico and from the De Soto expedition of 1540 in the Mississippi valley and perhaps others, were multiplying rapidly in Mexico and southwestern United States, due to the very nutritious foods available, and to the favorable climatic conditions.

The Indian pony.—This is the name given the feral ponies in western United States. They are not a distinct breed. Certain it is, however, that they have roamed the plains for so many generations that their characters have become sufficiently fixed to be transmitted from parent to offspring, and, in fact, they have become perfectly adapted to the environment.

Mustang, Broncho and Cayuse.—The Indian pony is often designated by various names common to particular localities. Thus in the South he is known as the Mustang; in the West as the Broncho; and in the North as the Cayuse. Because of the great endurance, the Indian pony has been very useful on the ranges, particularly in herding cattle. In recent years this strain has been much improved by crossing with the Arabian, Thoroughbred and American trotter. In his improved form, the Indian pony is useful wherever hardy, active and enduring horses are needed.

Description of the Indian pony.—In size the Indian pony averages 12 to 14 hands high and weighs 600 to 800 pounds. All colors are found, but duns are perhaps the

more common. The head is often large and bony, the barrel short and closely ribbed, the legs strong and cordy, and the feet excellent. The disposition has been much criticized, but this is largely a matter of training. As a rule, the tame ponies range the South, and the wild ones the North.

The Mexican pony.—This strain of pony was developed in Mexico, where it has ranged in a wild and semi-wild state for many generations. The Mexican pony is similar to the Indian pony in all important respects. In size the Mexican is perhaps the smaller, averaging 12 to 13 hands in height, and weighing 500 to 800 pounds. The color, conformation and quality are much the same in the two strains. In recent years the Mexican pony has been improved by crossing with the Thoroughbred, the Arabian, and the American trotter with a view to increasing the usefulness as cow ponies. The best of both types are sometimes used as polo ponies, which usually requires more than one cross.

CHAPTER XXIII

THE DOMESTIC ASS

The domestic ass is commonly known as the jack or the donkey, although the latter is often restricted to the smaller species, as the burro. The male is usually designated as jack or jackass and the female as jennet.

Species of the ass.—There are several species or varieties of the wild ass found in various parts of Asia and Africa, two of which are worthy of mention, namely, the Asiatic wild ass and the African wild ass.

The Asiatic wild ass (Equus hemionus).—This species is found in Asia, from the plains of Syria through Persia, Afghanistan and Thibet to the Chinese frontier. As a rule, it travels in small herds. The color varies somewhat, though gray, fawn and pale chestnut are the most common. The belly is of a whitish color. This species is notable for its speed and endurance. The height varies from 11 to 12 hands.

The African wild ass (Equus asinus).—This species is found most numerous in Nubia, Abyssinia, and in northeastern Africa, between the Nile and the Red Sea. It is assumed that the domestic ass descended from this species. The color markings, the ears, and the cry or bray are similar to the domestic ass. It is stated also, that this species dislikes streams of water, dark holes and the like—notable traits of the domestic ass.

Early history of the ass.—This animal was used as man's beast of burden at the dawn of authentic history. From the evidence it seems that the early people appropriated to their use those things which lay easiest at hand and from this it has been assumed that the wild ass easily passed into a state of domestication. Little attention was given to improvement until modern times.

Breeds of the domestic ass.—As with the horse, the distribution of the ass has been widespread and he has been subject to variation in food supply, temperature, moisture and general environment, with the result that many breeds or varieties have been developed. These breeds vary in size, ranging from the diminutive burro, often only 36 inches high, to the medium-sized draft horse. Of the large number of breeds only six are useful for

FIG. 123.—BURRO AT WORK

mule breeding in America, namely, the Andalusian, Maltese, Catalonian, Majorca, Italian and Poitou.

The Andalusian jack.—This breed was developed in southern Spain, particularly in the ancient Kingdom of Andalusia. It is a very ancient and distinctive race, as is evidenced by the statements of the profits arising from its use in propagating mules during the Roman occupation and before the time of Christ. The prevailing color is gray, and often practically white, with black very uncommon. This is a large breed, standing 14.2 to 15.2

hands high. The bone of the leg is large and firm and the breed possesses much substance.

The Andalusian in America.—In 1787 the King of Spain presented to General George Washington a jack and a jennet of this breed, which were taken to Virginia. The jack was called Royal Gift. About the same time General Washington received a Maltese jack, which he mated with the Andalusian jennet. The result of this union was a very famous jack called Compound, which proved to be much more popular as a breeder than Royal Gift, although the latter was selected from the royal stud. A few years later Henry Clay introduced into Kentucky a few jacks of this breed. These two men did much to promote the breed in America. Notwithstanding their influence, however, this breed never found favor in this country, due largely to the gray color, which is very objectionable in America, although a great favorite in southern Spain.

The Maltese jack.—This breed was developed on the Island of Malta, which is located in the Mediterranean Sea. This being a small island, with very poor soil, the number of jacks produced is exceedingly limited. The Maltese jack is the smallest of the more important Spanish breeds, rarely exceeding 14.2 hands high. The color is black or brown, with the latter more characteristic of the breed. The breed is described as of good form with well-carried head and ears. The bone resembles that of the Thoroughbred horse, and the breed is characterized by much life and vigor.

The Maltese in America.—About 1787, Marquis Lafayette and the Knight of Malta each presented General Washington a jack of this breed. It was the present by Lafayette that sired the famous Compound. It is also stated that the frigate Constitution, during her first cruise in the Mediterranean, imported jacks from Malta to the District of Columbia. Not long afterwards others were introduced by officers of the navy, and a few very

valuable ones were brought over in merchant's ships. Formerly the Maltese jacks were broadspread, but in recent years they have become rather unpopular because of their small size.

The Catalonian jack.—This breed was developed in northeastern Spain adjacent to France, particularly in Catalonia, although it is widespread and often found in France. The color is usually black, and often jet-black, which is marked with light points about the muzzle, eyes and belly. While brown of varying shades is sometimes found, it is uncommon. The hair is naturally thick and short. The size is classed as large, the height averaging 14.2 to 15 hands, with good specimens occasionally exceeding this height. The Catalonian is a jack of great style and beauty and superb action. The head is trim and neat, with ears well carried, suggestive of character. The bone, while not large, is very hard, fine of texture, and free from meatiness. The breed is wiry, tough and matures early.

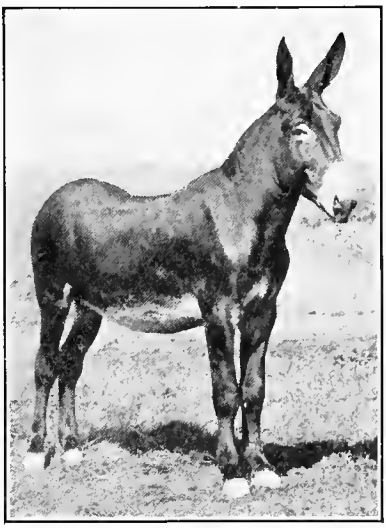

FIG. 124.—CATALONIAN JACK

The Catalonian in America.—In 1832, Henry Clay introduced an excellent specimen of this breed to Kentucky. This jack was so successful and his popularity grew so rapidly that Clay imported a number of others of this breed. At an early date a few jacks of this breed

found their way to Virginia, where they were received favorably. Long before the Civil War, Benjamin Franklin and others made importations to middle Tennessee and to Charleston, South Carolina. Since the war, a large number have been brought to this country, especially to Tennessee, Kentucky and Missouri, the principal mule-breeding states of the Union. Mules sired by the Catalonian jacks have much size and quality, and have been ranked as the best in the world. They are stylish, active, early maturing and good sellers. A large percentage of the jacks imported to America come from Catalonia.

The Majorca jack.—This breed is a native of Majorca, one of the Balearic Islands, in the Mediterranean Sea, off the coast of Spain. The soil is very fertile, and though it is necessary to irrigate much of the island, it is very productive of rich, luxuriant pastures. This, no doubt, accounts for the size of the Majorca, which is the largest of the domesticated asses, ranging in height from 15.2 to 16 hands, and even more. The head and ears are described as conspicuously large, the latter being larger than those of any other breed and poorly carried. The bone is exceedingly large, with a body to correspond. There is a general coarseness throughout, as well as a lack of the indications of sufficient quality. Because of the enormous size and poor quality the Majorca lacks in style and action, and, in fact, is often criticized as inclined to sluggishness. In its native home it has long been bred with much purity and large numbers are used in the government artillery service. It is usually black or brown.

The Majorca in America.—There is no authentic data as to the first importations, though they were introduced about the middle of the nineteenth century. Formerly the breed was popular, because of its large size and good color, and many were introduced, but it is not destined to attract favorable comment in this country because of the general coarseness, lack of quality and sluggishness.

The Italian jack.—This breed is a native of Italy, where

its distribution is widespread, although little attention is given to its breeding. Its principal use is that of a pack animal. The color is usually black, but bluish and grayish colors are not uncommon. In size the Italian jack is among the smallest, rarely exceeding 13 or 14 hands. Considering the height, these jacks have rather large bone and good weight of body. They are well proportioned and have good action.

The Italian in America.—As with the Majorca, there is no record of the first importations although jacks of this breed very early found their way to Tennessee and other mule-producing states. The chief cause for their early introduction is said to have been their cheapness. They did not meet with favor in America, principally because of the small size, although they have also been criticized as being prone to serve a mare, and as having a tendency to viciousness. L. M. Knight, who has written much on jacks, jennets and mules, states that it is his observation that small jacks are more likely to develop vicious habits than large ones, and he also adds that jacks are not trustworthy animals.

FIG. 125.—PRIZE JACK "DR. HARTMAN"

The Poitou jack.—This breed was developed in southern France, especially in the province of Poitou, bordering on the Bay of Biscay. Here, in the departments of La Vendee and Deux-Sevres, the most fertile part of all France, the Poitou ass is bred in his greatest purity. This is a very old breed, as mention is made of it as early

as 1016 in French literature. The prevailing color is black, with light points, although grays are occasionally found. The height ranges from 14.2 to 15 hands, with the larger specimens sometimes standing somewhat taller. The Poitou is one of the most powerful of the breeds of jacks. He is covered with a thick growth of long, silky hair, which is particularly noticeable in the legs, neck and ears. For this reason he is very unattractive unless kept well groomed. These jacks are in great demand in France, where they are bred to draft mares, from which are produced large mules of the most valuable kind.

The Poitou in America.—This was the last of the distinctive breeds of jacks to be introduced to this country. Notwithstanding this breed of jacks produces a good type of mules, few are to be found here. In fact, the province of Poitou cannot supply the home demand for the Poitou jack, and the French breeders, at least in certain parts of the county, are obliged to use the Catalonia and the Majorca jack. Because of the great demand, Poitou jacks command fancy prices, many selling for $2,000, with the best specimens realizing approximately twice as much money. According to Knight, the Poitou jack is the best for mule breeding in this country, and he places it above the Catalonian, stating that the mules have sufficient size, with more quality and action than can be obtained by any other breed of jacks.

The characteristics of the ass.—The domestic ass presents a great contrast to the horse. In the ass, the head is large and bony, the ears very long, the foretop and mane very scanty and the tail has no long hairs except at the lower part. The entire body is often covered with long hair. The bone is often large, while the joints and feet are small. The hind legs have no callosities (chestnuts), although they are present on the forelegs. The ass makes a peculiar cry called a bray.

Jacks useful for mule breeding.—This animal is very surefooted in going over mountain passes and slopes dif-

ficult for horses, and hence extremely useful as a pack animal, in which capacity it was formerly used almost exclusively. While it is still useful as a pack, in mining regions, in difficult passes, and the like, yet its major use in America is that of siring mules. Since it is the larger mules that are the more useful and command a premium on the market, only jacks of considerable size should be used in mule breeding. The rules of entry to the American Jack Stock Stud Book on the subject of height and color, are as follows: After January 1, 1892, jacks and jennets, of unrecorded sire or dam, shall be eligible to registration only when black with light points and of the following height, standard measure: Imported jacks and jennets, and native jennets, the produce of unrecorded sire or dam, 15 hands; native jacks, the produce of unrecorded sire or dam, 15.2 hands. From this it would seem that for best results in mule breeding the jack should stand approximately 15.2 hands high and be black with light points. The temperament, quality, style and action should also be considered, as these will be reflected in the offspring.

FIG. 126.—PRIZE JACK "GENERAL WOOD"

Organizations and records.—In 1888, the American Breeders' Association of Jacks and Jennets was organized as a stock company and a stud book established, of which several volumes have been published. In France an association for registering jacks and jennets also exists.

CHAPTER XXIV

THE MULE

While England, France, Belgium, Germany and Spain have developed most of the breeds of horses and jacks, it has been left for America to prove the usefulness of the mule. It seems strange that these older countries should have given mule breeding so little attention, particularly in view of the animal's usefulness. The only excuse for this neglect is that the producing of a mule removes the opportunity of raising a horse.

The mule a hybrid.—The mule is not a true breed, but is a hybrid, the result of a cross between a jack and a mare. As is usually the case, where two species are crossed, the mule is sterile and will not breed. The sexual organs are supposed to be incomplete, although several cases are on record where mare mules have conceived and produced young. These are remarkable cases, however, and are not accepted as authentic by most scientists.

The history of the mule.—We have no reliable data as to when the first mules were raised, although they have been used more or less since the time of Christ, and perhaps even before. The literature of ancient Rome and Greece makes frequent reference to the mule, in which he seems to have served various purposes. While the mule seems to have served a useful purpose since very early times, it is only in recent years that his true value has been appreciated.

The mule in America.—From the time that the King of Spain presented General George Washington with an Andalusian jack until the present, mule breeding has had a steady and rapid growth in America. In fact, mules were bred in this country as early as the sixteenth cen-

tury. Notwithstanding ours is one of the newest countries in the world, it was left to us to establish the true economic value of the mule. At present more than one-half of all the mules in the world are to be found in the United States. This recognition of the value of the mule is very largely due to the intelligence of our Southerners, who were the first to adapt him to general purposes.

The characteristics of the mule.—Like all other animals, the mule inherits qualities from both sire and dam. Thus the mule differs from the horse. The head is larger and more clearly defined; the ears are longer; the foretop, mane and tail tufted; the body smaller and more cylindrical; the quarters not so heavily muscled, although, considering size, the mule is equally as strong, if, indeed, he is not more powerful than the horse; the legs are superior in quality; and the feet of the mule are smaller and longer than those of the horse, with the arch of the hoof greater.

The mule is exceedingly variable in size and weight, depending on the parentage. On the market mules are divided into classes according to their size and the work they are capable of performing (p. 320).

While the color is exceedingly variable, black, brown and bay, with light points, are the most popular. The color is a very important consideration in America, therefore, blue, gray, white, buckskin, yellow and like colors are objectionable. In temperament, the mule is quiet and patient. He is less nervous, less subject to fright, and more certain than the horse. For hard pulling and steadiness in the collar he has no equal in the world. The

temperament of the mule has been a subject for much unjust criticism, for when properly handled he is among the coolest of animals.

The endurance of the mule.—In this respect the mule is superior to the horse. It is often true of hybrids that they are more resistant than either parent. For long, hard journeys through semi-desert regions, over mountains, precipices and through difficult passes the mule is preferred to the horse. Mules usually live longer than horses and their period of usefulness is much greater.

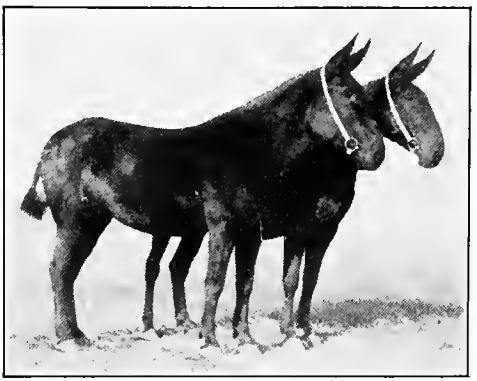

FIG. 127.—SPAN OF PRIZE MULES

Wallace gives the mule the following advantages over the horse: Not particular as to the quality of the food; more surefooted and not nearly so liable to fall; less liable to become lame; more pluck and perseverance; walk faster; pull steadier; and in competition with a horse of equal weight the mule will accomplish more work.

Resistance of mule to disease.—Unlike the horse, the mule will seldom eat more than is good for him, even though the food be placed before him. Thus the mule very largely escapes all diseases caused by overfeeding, which often proves fatal to the horse. The legs and feet of the mule are less subject to disease than in the horse, although ringbone, sidebone, spavin and like troubles do occur. In most contagious and infectious diseases the mule is perhaps no more resistant than the horse.

Uses of the mule.—As a working animal, the mule's adaptability is almost universal. He is unaffected by the climate, working equally as well in the cold, in the hot, in the moist, and in the dry climate. He serves his master in any capacity—as a pack animal, under the saddle, and in harness, both light and heavy. He is found wherever man needs a beast to help bear his burdens. The mule's docility and coolheadedness, as well as his resistance to disease, especially those resulting from overfeeding, make him a very desirable animal when ignorant and careless workmen must be relied upon.

Distribution of the mule.—While more than one-half of the mules in the world are found in the United States, yet these animals enjoy a widespread distribution. This is due in a large measure to their general adaptability. They find especial favor in Spain, France, Portugal, Italy, and Africa. Mules are found in every state in the Union, but more especially in the southern states. Kentucky and Tennessee have been noted for producing mules of quality for more than a century. Missouri also has long been noted for the production of mules of quality. To these states many fine jacks have gone, and from them in turn many fine mules have been sold. St. Louis is the leading mule market of the world. At this market thousands of mules are purchased by the various governments for military purposes.

Organizations and records.—As mules do not breed there is no association promoting their interests as such, although the American Breeders' Association of Jacks and Jennets, which was organized as a stock company in 1888, has the welfare of this animal in hand. This is because the jack is used almost exclusively to sire mules, and it is to the interest of jack breeders and importers to strive for progress in mule breeding.

CHAPTER XXV

PRINCIPLES OF HORSE BREEDING

The development of the various breeds of horses dates back to the middle of the eighteenth century. About 1760, Robert Bakewell assumed the management of the estate on which his father and grandfather had resided at Dishley Grange, Leicestershire, England. Young Bakewell conceived the idea that he had only to select the most valuable strains, such as promised the greatest returns to the breeder, and that he should then, by careful attention to progressive improvement, be able to produce a breed from which he could derive the maximum advantage. He made excursions into different parts of England, in order to inspect the different breeds and to select those best adapted to his purpose. In this study Bakewell separated the characters of form, function, quality, as well as propensity to fatten, considering them as his units of selection. Thus Bakewell recognized the two cardinal principles of animal improvement —similar produces similar, and the form bears a close relationship to the function—based upon which he originated a system which has resulted in the development of our specialized breeds of horses.

VARIATION IN HORSES

Variation is the basis of improvement among all farm animals. If characters were absolutely fixed and unchangeable, then no improvement could be secured. The size of the draft horse could neither be increased nor diminished, and the speed of the trotter would remain constant from generation to generation. Thus the offspring would be no better, or poorer, than the parent.

Frequency of variation.—Among farm animals, variation is universal. No two horses are alike. To those unfamiliar with horses, one animal of a well-matched team may look exactly like the other, yet the trained eye will readily recognize differences, and can describe each animal so that those with equal training may recognize it. These differences involve all characters. Two horses of the same breed may differ widely in conformation and carriage, particularly of the neck and tail, in color, quality, action, and the like.

Kinds of variation.—There are four kinds of variation —quantitative, qualitative, functional and deviation from the common pattern. Quantitative variation has to do with size, and is one of degree only. This is the simplest form of variation and is very common. Two horses of the same breed, one may be large, the other small; or on the same animal one foot may be larger than the others; and, in like manner, all characters may vary in size. Qualitative variation has to do with quality only, and is distinct from size. Evidences of this are also abundant, the quality of no two horses being alike, as one may have a coarser, rougher hair and a thicker hide.

Functional variation has to do with functions only, and is distinct from either size or quality. It has reference to the activity of the various organs and parts of the body, such as muscular activity, glandular secretions, and the like. Evidences of this are common, as some horses walk faster than others, and some trot faster, while still others pull heavier loads. Deviation from the common pattern has reference to the irregular appearance of repeated parts, such as extra toes, extra teats, and the like. This class of variation is seldom observed among horses, but is common among plants, such as the stooling of corn, wheat and oats, as well as the doubling up of flowers.

Principal causes of variation.—Since variation plays so important a part in improvement, it is of interest to

note the conditions that produce it, particularly since by modifying these conditions, we can aid in producing variation in a desired direction. Thus, if we wish to increase the size of the horse, the conditions that cause the animal to vary in that direction are of interest and should be well understood. In horse breeding the principal causes of variation are the environment, crossing and use.

Environment.—By this term is meant the surroundings of the animal. The chief factors of environment, through which we seek to improve our horses, are those of climate, food and care.

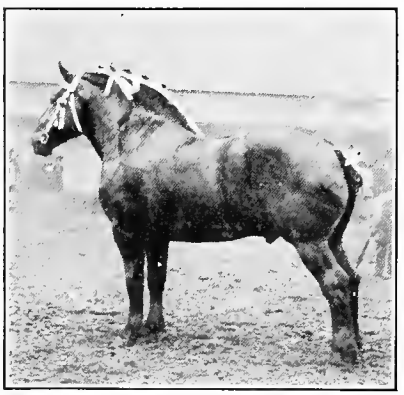

FIG. 128.—PERCHERON STALLION "GALBA"

The climate is of interest largely as it controls the food supply, although it does affect the external coat to some extent. When the horse is exposed to cold, damp weather, the hair becomes longer and thicker than if protected. The natural effect of the climate is modified by housing, and we can move the horse from one climate to another without serious results.

No single factor influences development to a greater extent than the food supply. Full feeding increases the size and the constitutional vigor, while withholding the food not only arrests growth, but weakens the capacity for future development as well. In order to secure increased development of all the organs, the animals must be supplied with more food than is required for the performance of the normal function.

The care that the horse receives has a molding influence upon the variation he is likely to undergo. The animal that is well cared for—that is, properly housed, fed, watered, exercised, groomed, and the like—cannot fail to respond to such treatment. Many persons have fallen short of success in horse breeding by depending upon blood alone for improvement. They have forgotten that all of our improved breeds are the product of adequate nutrition, combined with intelligent breeding. suitable environment and kindly care.

Crossing.—The mating of dissimilar animals is a prime cause of variation. Up to the time of Bakewell, cross-breeding was a favorite method of seeking improvement. Previous to this time crossing was made easy from the fact that no record of breeding was kept. It was observed that mating two animals reared under different conditions, resulted in increased size, more vigor and greater prolificacy. While this system of breeding rendered valuable service in the formation of new breeds it must be remembered that the cross-bred animal does not breed true in general characters; in fact, he has nothing to breed true to, as his parents were unlike. While crossing, such as the mating of two animals from different breeds, is a course of much variation, the results are usually disappointing in the end.

Use.—It is well known that use stimulates and disuse dwarfs development. Examples of the beneficial effect of exercise are common. Athletes train and musicians practice for many hours each day that they may become skilled. Horses intended for racing are trained from colthood in order to make the most of any natural ability to trot or run. Thus, use and disuse become important factors in causing variation.

SELECTION IN HORSE BREEDING

In establishing or creating a type, selection plays an all-important part, as it enables us to encourage the

production of those animals that meet the demand and to prevent, in part at least, the production of undesirable individuals. In selecting horses for breeding purposes, there are three important factors to be considered: First, the individual merit, or the perfection of the animal as a representative of its race, type or breed; second, the pedigree, or the purity of the ancestry and the probable capacity of the individual to reproduce itself or to show

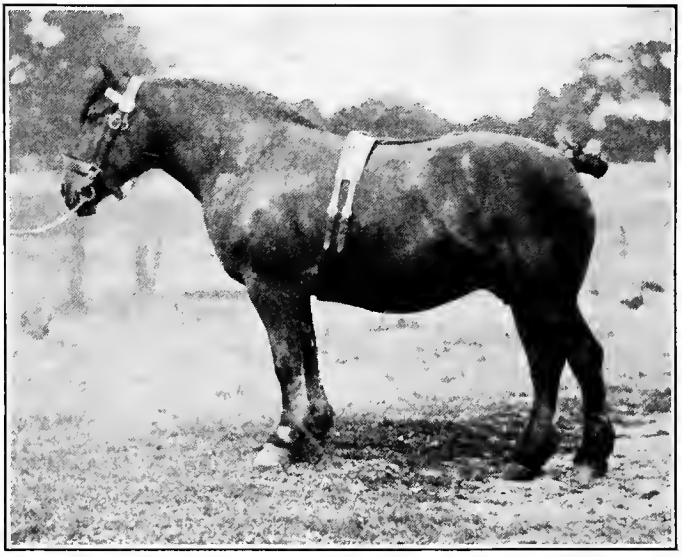

FIG. 129.—BELGIAN MARE "ELEQUANTE"

improvement; and, third, the suitability of the two individuals to be mated.

Individuality.—In breeding horses the perfection of the animals selected should be carefully considered. Occasionally we give too little attention to this and select breeding animals on the basis of their pedigree. Such practice may prove disappointing, as many inferior in-

dividuals are recorded. because such animals command a good price on the market. In choosing breeding horses each animal should be closely inspected and only superior individuals placed in the stud.

Pedigree.—The purity of the ancestry is an important factor in choosing breeding animals, as the capacity of a horse to produce superior offspring will depend largely upon his ancestors. It is often a question which should receive the more attention, the individual merit or the pedigree. There are four possible conditions that should always be borne in mind: First, the offspring of a superior individual with a good pedigree is likely to possess merit; second, the offspring of an inferior individual with a good pedigree may possess merit; third, the offspring of a superior individual with a poor pedigree is likely to be inferior in merit; and, fourth, in all probability the offspring of an inferior individual with a poor pedigree will be distinctly inferior.

Formerly we associated great length of pedigree with breeding quality, but the present evidence goes to show that it is the immediate ancestors that are of most importance. Galton, in his "Law of Ancestral Heredity," sets forth the idea that one-half of the full heritage comes from the parents; one-fourth from the grandparents, and so on to infinity. This being true, an offspring will procure seven-eighths of its full heritage from the three nearest generations of ancestors.

In selecting breeding horses, the performance, when available, as in race horses, should be considered, as it affords valuable information as to what the offspring will probably be like. A good example of this is seen in the speed reduction table where the record time was reduced from 2.48½ to 1.55¼ in one century (p. 130).

Mating.—Two animals, to be suitable for mating, should be as nearly alike in general characters as it is possible to select, otherwise the outcome of a union cannot be foretold. Since, as we have already seen, no two

horses are alike, we are obliged to strike an average between the characters of the parent and what we desire to get in the offspring. When the offspring shows good qualities the mating is considered a fortunate *nick;* when there is no resemblance to either parent, but to some near ancestor, it is called *atavism;* and if to some of the far-removed ancestors, it is called *reversion*, although these terms are often used interchangeably. The success of a horse breeder often depends upon his ability to mate the animals properly. Some persons become very skilled in such matters.

HEREDITY

There are two great forces underlying all breeding operations: First, similar tending to beget similar, which has to do with heredity; and, second, the great run of variation through which improvement is sought. On heredity, or the extent to which variations are transmitted or passed down from parent to offspring, all successful breeding operations depend. Variations that are not transmitted are of no importance in breeding, though they may be of consequence to the animal possessing them. While the transmission of variation is a much-discussed question, practical animal breeders work on the supposition that such is the case. Horse breeders believe that: If high-class trotters are to be produced, they must mate animals that can trot fast; that, if high acting horses are desired, high actors must be united; and that if heavy horses are wanted, then horses of weight must be mated.

Prepotency.—There is variation among parents in their power to stamp characters upon the offspring. When the offspring resembles one parent more than the other, the one transmitting its characters is said to be prepotent over the other parent. Thus prepotency becomes of importance in improvement, and the influences that

tend to produce it in the individual are worthy note. While many of the factors that influence prepotency are little understood, those that do aid and are under the control of man are: First, purity of breeding, which makes for stability. The introduction of outside blood lessens the stability and the certainty of transmission. Second, strong constitutional development, which strengthens the characters; and, third, in-breeding, which aids prepotency, as it strengthens dominant characters.

In breeding horses the prepotency of the male is given more consideration than the female. This is due to the fact that the sire is the parent of more individuals than the dam, and not to individual resemblance. This is fortunate, as improvement can be more cheaply secured through a good sire from the mere fact that he is represented in more progeny.

Fertility.—The number of offspring produced by horses of either sex varies greatly. Some mares fail to breed at all, some breed once and go barren, and some breed every other year; while others breed with much regularity. The English Thoroughbred mare Pocahontas produced fifteen living foals and lived to the age of 33 years, while Old Fanny Cook also produced fifteen, the last one in the twenty-ninth year of her life. Stallions vary likewise, some producing a very low percentage, while others are almost fully fertile. The Standardbred stallion, Gambetta Wilkes, has 229 standard performers, and Allerton has 246, while there are 10 that have over 150 (p. 120). In these cases, however, much depended upon the opportunity, as the better the sire the better the class of dams offered, and hence the better the offspring, all of which leads to still further opportunities.

Sterility.—Perhaps the horse breeder's greatest difficulty is the failure of his animals to breed freely. The causes which lead to sterility are many, some of which are understood and more or less preventable, while others are little known and perhaps beyond control. Some of

the known causes are: Confinement and lack of exercise; irregular supply of food; food lacking the proper nutrients; animals in too fat a condition; in-breeding; excessive breeding; and the like. To lessen sterility, we should avoid all causes likely to produce it.

Sire and dam.—The relative influence of the parents is a much-discussed question, and all kinds of statements are made concerning the influence that each parent exerts on the offspring. So far as is known, however, the parents play an equal part in their control of the characters of the offspring. This, of course, is aside from the question of prepotency, discussed above, and in which either parent is likely to dominate over the other.

SYSTEMS OF BREEDING

The system of breeding to be employed in raising horses will depend on the purpose and circumstances of the breeder. If the object is the production of pure-bred animals the system employed may differ from that used in raising horses for the market. The circumstance of the breeder may modify the system, as he may be so situated as to make it practically essential for him to employ a given method.

Grading.—The mating of unimproved animals with those more highly improved is perhaps the most common system of breeding. Usually the improved parent is the sire and the unimproved one the dam. This is the safest for beginners, as it is cheap. If a worthy pure-bred sire is used improvement follows rapidly. The first generation of offspring is half pure, the second three-fourths and the third seven-eighths, and so on. By continuing this grading process, selecting the best mares as breeders, it is entirely possible and by no means difficult, to produce animals equal to pure breds in the production of work. In view of the ease with which improvement can be obtained by this method it is surprising that our horse stock does not improve more rapidly.

Crossing.—Because of the strong tendency to produce variation, crossing is seldom employed as a system of breeding horses. The crossing of breeds results in the production of nondescript offspring, that lack in efficiency and that fail to command a remunerative price when placed on the market. Attention is directed to crossing as a system of breeding, largely because it is the method employed in breeding mules, the offspring of a jack and a mare; as well as the hinny, the offspring of a jennet and a stallion. It is interesting to note that the mule more nearly resembles the jack, while the hinny resembles the stallion. This has given rise to the statement that the offspring resembles the sire in external characters and the dam in the internal characters.

FIG. 130.—AMERICAN SADDLE MARE

Gregor Mendel crossed a number of plants and studied the inheritance of contrasting characters in the hybrids. By pairing certain characters, as color, form, and the like, he discovered that hybrid parents produced offspring of which one-half were again hybrids; while one-quarter were pure to each of the original parent forms. This is called "Mendel's Law of Hybrids," and through its application plant breeders are able to transfer certain characters from one group of plants to another. This promises a great field of usefulness among plants and the law is receiving universal attention, although it is little used by horse breeders.

Line-breeding.—When animals of a single line of descent are mated the system is called line-breeding. It

combines animals similar in their characteristics, narrows the pedigree to a few and closely related lines of descent and thus gives stability to the strain or breed. This system secures uniformity and increases the prepotency among horses, but it must be remembered that it acts on good and bad characters equally, and, therefore, necessitates vigilance in selecting breeding animals.

In-breeding.—When animals closely related are united the system is called in-breeding or in-and-in-breeding. This is line-breeding carried to its limits, and consequently it intensifies all the advantages and disadvantages of that system of breeding. This system was first employed by Robert Bakewell, who shocked the modest people of his time by mating the animals that possessed the characters he wished to propagate without regard to relationship. Since his time it has been successfully employed by many breeders and many of our breeds of farm animals owe their early origin to this system.

Breeding from the best.—The feasibility of this system will depend on the situation. If a pure-bred sire is mated with common grade mares due consideration should be given the characteristics of each, as unsatisfactory results would probably follow uniting animals of widely differing characters. The suitability of the animals to be mated should be recognized as well as the perfection of the individuals, otherwise one will soon find himself in possession of animals varying in all essential characteristics. For the beginner, however, and until he learns the attributes of the animals with which he is working it is perhaps safest to recommend the system of breeding from the best, as it is likely to result in the production of good individuals even though they lack in uniformity.

CHAPTER XXVI

PRACTICAL HORSE BREEDING

The average farmer has constant use for his horses approximately one-half of the year, during which time they are often overworked because of insufficient horse power. The remainder of the year the cost of maintaining the animals often exceeds the value of their services. This is likely to be the case on farms where horses are kept simply for the work they can do. On the other hand, there are many very successful farmers who keep sufficient animals to do the work without rushing, even during the busy seeding and harvest season. On such farms mares are usually kept and in order to make them earn their keep during the idle season, they are bred, thus producing a colt in addition to the work. The money obtained from the sale of horses produced in this way will fully compensate for the extra horses, and for the maintenance of all horse stock during the idle season. Thus, instead of purchasing a team every few years, as is the custom on so many farms at the present time, the horse-breeding farmer has an income from the sale of surplus stock.

Number of horses produced.—There are no data available in the United States on the number of horses consumed, or used up, in a year, but conservative estimates place it at approximately two million. In addition to the horses consumed at home there are a few exported. These animals must be replaced or there will be a horse famine. There are approximately 10 million mares on farms in the United States, of which we will assume that one-half, or five million, are of breeding age. If we are to produce more than two million colts it means that something like one-half of these mares must be bred each year.

Horse-breeding states.—The thirteenth United States census gives figures showing the number of colts produced in each state for the year 1909, as well as the total number of mature horses at the time the census was taken. In this classification all horses over fifteen and one-half months of age are considered mature. From these figures we learn that for every 100 mature horses there were 9.9 colts produced in the United States—2.8 colts in the New England states; 5.0 colts in the middle Atlantic states; 10.5 colts in the north central states; 7.6 colts in the south Atlantic states; 9.2 colts in the south central states; 14.2 colts in the mountain states; and 11.3 colts produced for each 100 head of mature horses in the Pacific states.

Conditions favorable to horse breeding.—So far as natural conditions are concerned much of the United States affords ideal breeding ground for the horse. This is emphasized by the manner in which feral horses bred when given their freedom by the early settlers. Perhaps nowhere else in the world do the natural conditions surpass those of Kentucky, especially for the production of light, stylish horses, such as the Thoroughbred, the American Saddler and the Standardbred horse. The same is true of the heavy drafter throughout many of the north central states.

Mechanical power.—The usefulness of mechanical power is going to relieve the horse of much of the cheaper forms of labor such as long distant deliveries, plowing large areas, and the like. While the future influence of these motors cannot be foretold, past experience is encouraging to the horse breeder. It is not likely that these machines will affect the horse market, at least for some time to come, any more seriously than did the railroads and electric cars. During the past decade, in which motors have been an active competitor, the price of the horse has risen 138 per cent. Evidently these machines have not seriously affected the demand for horses, as such increase in value would be impossible.

At present it cannot be denied that the automobile is affecting the price of fancy and pleasure horses; but past experience and present conditions indicate that the time is near at hand when automobiles will be as common and as cheap in proportion as bicycles, and then the fancy and pleasure horse will be as great a luxury as ever.

PRACTICAL PLAN FOR BREEDING HORSES

Perhaps the most discouraging factor in horse breeding in this country is the lack of type and quality among the common horse stock. This is due largely to the lack of a definite plan in breeding horses. Our horse breeders have crossed types and breeds promiscuously, which has resulted in general deterioration. To avoid this condition the beginner should decide upon a clearly defined plan of procedure. A good knowledge of horses and horse breeding should be obtained. Breeding establishments and horse-producing farms should be visited. A careful study should be made of the conditions, such as the market, the kind of work to be accomplished, and the like. Some markets and some conditions will favor the breeding of one type of horse, while other conditions will favor another type. In working out the plan, it should be kept clearly in mind, whatever the type or breed chosen—whether it is draft, coach or driving, for draft, stylish action or speed—that none but superior horses will sell at remunerative prices. There

FIG. 131.—SHIRE STALLION "LORD CARLTON"

will always be an overproduction of common horses, which will be the first to be affected by oversupply and business depressions and the last to be revived.

Co-operative horse breeding.—This system has been extensively introduced into some of the states and most excellent results are reported. A number of farmers possessing the same type or breed of mares band together and form a horse-breeding association. This association provides a suitable stallion, advertises stock, holds sales and often makes exhibits at the local and state fairs. Meetings are held for the discussion of horse-breeding matters and in this way each member receives the benefit of the others' experience. This serves to promote uniformity, to improve the quality and to improve the standard of the horses raised in the locality.

"Company plan."—Often a salesman representing an importing firm enters a locality and forms a "company" in order that he may sell a horse. This company consists of a varying number of men, each paying a proportionate amount. The company thus formed usually pays a high price for the horse, as the price must cover many expenses. Further, the stallion thus thrust upon the community is seldom of the proper type to mate with the local mares. Often a good start is made in the grading up with a certain breed, as the Percheron, when a company is formed for the purchase of a stallion of another breed. Such a stallion is a detriment to the community, although he would have been valuable if of the same breed as the mares in the locality. The company plan of purchasing stallions, therefore, is objectionable, not alone because of the high price, but because they are often unsuited to mate with the mares of the locality.

Selection of animals for breeding.—The general principles of heredity and variation must be kept in mind in choosing breeding stock. This applies to the mare as well as to the stallion. When the colts are not up to standard there is a tendency to criticize the stallion,

whereas undesirable qualities of the mare are as likely to appear in the offspring as are the bad qualities of the stallion. It is a serious but common error in horse breeding to suppose that the bad points of one animal can be overcome by the good points of the mate. Undesirable characters of the mare are not to be offset by choosing a stallion that is abnormally developed in a contrary direction. In selecting breeding stock we must remember that success will depend largely upon the perfection of the foundation animals, both mare and stallion.

Breed and type.—In formulating the general plan for breeding horses we should first decide upon the breed and type. The most profitable breed will be influenced by the local conditions and the tastes of the breeder, as there are no best breed and type for all conditions. The light types naturally belong to farms devoted to dairying, fruit farming, market gardening, and the like. On such farms there is little heavy work, such as plowing and heavy hauling. Further, the necessity of reaching the market or the creamery requires light, active horses.

On general purpose farms where there is much plowing and other heavy work to be done, the heavy horse finds his true home. While the horses belonging to the draft type are not so active or stylish as those of the light type, they possess many advantages. Draft horses can be reared with less risk than the lighter and more active types. They are not so likely to injure themselves as the higher strung animals; and should a slight blemish occur, it is not considered so serious as in the case of a roadster or coacher. Draft horses can be put to light work much younger and do not require so much training to fit them for their life work. Further, the horses of this type are in constant demand for city traffic. They are the last to be affected by business depressions and the first to recover; they are the least affected by automobiles, motor cars, and the like; they are not affected by fads, fancies, or fashions, and always command a remunerative price.

The mare.—In selecting breeding stock, the influence of the mare in transmitting qualities to the foal is often underestimated, and frequently ignored entirely by horse breeders. No doubt this accounts for much of the disappointment in breeding horses. No matter what type or breed is selected, the brood mare should be as nearly perfect as it is possible to obtain. She should be of good size for the breed to which she belongs, ponies excepted. Her conformation should be rather open, showing much chest and girth capacity, and insuring constitutional vigor. The pelvic region should be broad, to insure ease of foaling.

The legs and feet of the brood mare should be carefully considered. The bones of the limbs should be clean and free from coarseness, so that the legs appear wide and flat. The tendons should be prominent and free from meatiness, and the hair fine, silky and glossy. The feet should be of medium size, well shaped, dark colored, tough, elastic and close of texture. Mares having poor hoofs, too small, too large, too soft and spongy, too weak, brittle, wide and low in the heels, too shallow and flat, too steep and contracted, are not desirable for breeding purposes. The wearing qualities of the horse depend largely on the character of the legs and feet.

The brood mare should have a good disposition. Infirmities in temper seem to be transmitted to the offspring. Pregnant mares are often quarrelsome and many distressing accidents occur when the mare has a naturally mean disposition.

The stallion.—If possible, choose a sire of known breeding qualities. The stallion that is known for the production of uniform colts of excellent quality is the one to patronize. For this reason middle-aged stallions are preferred to young ones.

Pure-bred sires always should be patronized, although the individuality of the animal should be given equal prominence with the pedigree. As an individual, the sire

should be a perfect representative of the breed to which he belongs. The pedigree alone does not guarantee his worth, as many inferior pure-bred animals find their way into the stud books. The conformation, quality, action and temperament should be carefully considered. Note the condition. Stallion owners like to have their animals very fat, as this covering often conceals many defects. When possible it is preferable to patronize stallions that are worked moderately. This exercise serves to keep the animal in excellent condition and a better grade of colts will be obtained than if this exercise is withheld. It is not sufficient that he simply be jogged, as this does not stimulate proper development.

The stallion fee.—Perhaps no single factor has done more to discourage profitable horse production than the low service fee of the grade or scrub stallion. The services of a desirable stallion cannot be had for less than $15 without the owner losing money on his investment, yet many cheap and inferior horses stand for less money. The common farmer, not appreciating the value of good blood, patronizes the inferior animal because of the low fee, with the result that the offspring is a nondescript and not worth the food required to raise him, while the superior animal is driven from the locality for lack of patronage.

FIG. 132.—PERCHERON STALLION

There are three methods of charging stallion fees in common practice: To insure a living foal; to insure the mare in foal; and by the service. Often a stallion stands at a certain fee for a single service and at a higher one

to insure a living foal, the farmer being given his choice. To get at the relative value of these propositions we will consider some data compiled by Sanders which, according to our own observations, seem to be approximately correct. This data was obtained from the German studs, in which 1,000 stallions served 42,000 mares, with results as follows:

	per cent.
Mares served	100.0
Mares in foal	67.7
Live foals dropped	53.3
Mares aborted and miscarried	4.8
Mares dying or missing	9.6

According to this table a stallion will make as much money for his owner by standing at $10 for a service as he will at $15 to insure the mare in foal, or at $20 to insure a living foal. These sums are approximate, and they serve as a very good guide in deciding which of the three conditions to accept when they are optional with the farmer.

Lien laws.—Many of the states now have laws granting a lien on mare and foal, resulting from the services of a properly recorded and advertised stallion. These laws make the mare or foal, or both, holden for the service fee. These laws differ widely in the various states and the horse breeder should become familiar with the provisions made by the statutes of his own state. The wording of some of these statutes is not clear, and in such cases the advice of a lawyer should be sought.

Soundness.—Both sire and dam should be free from all forms of unsoundness or diseases that are hereditary, transmissable or communicable to the offspring. While absolutely perfect animals can rarely, if ever, be found, and few horse breeders can afford to reject breeding stock for small and unimportant defects, yet not until both mare and stallion are free from unsoundness can we hope to raise the excellency of our horses to the

degree possible as the result of intelligent breeding and development.

It would seem logical to expect that if we used unsound sires and dams their progeny may prove equally unsound, or if one parent is unsound its unsoundness may offset the soundness of the other parent and endow the offspring with a tendency to like unsoundness. Many breeders have fallen into the grievous way of considering any broken down, halt, maimed, blind or otherwise unsound mare fit for breeding purposes when no longer able to work. It is certainly poor policy to knowingly use unsound breeding animals and thus promote unsoundness in the offspring.

Uniformity and persistency in breeding.—We have not had sufficient regard for uniformity and type in our horse-breeding operations. All sorts of crosses have been made, with the result that our horses are of mixed breeding and many of them mongrels and misfits. The only certain method of raising the general average of our horses, in respect to type, quality, action and specific utility, is by persistent breeding to sires of the same breed until the blood of that breed has wholly obliterated the native blood derived from the mares originally used. Were this practice followed, for even a few generations, we would find general excellence of form, quality, action and utility, such as characterize the breed, used in the work of improvement.

Our farmers have been using pure-bred sires, to a greater or lesser degree, for more than half a century, yet few, if any, communities have persistently used such sires in a right line until the characters and quality of any one breed have become predominant. The importance of persistency of effort in horse breeding is well illustrated in the district of La Perche, in France. This county has become famous throughout the world for one breed of horses—the Percheron—which possesses marked breed prepotency and breeds so true to type. The Clydesdale

of Canada affords another example. The early Canadian settlers were partial to the Clydesdale breed, and hence imported Clydesdale stallions of best character which have been employed in the breeding operations of that country since the year 1842, when Archibald Ward of Markham, Ontario, imported Grey Clyde (78). Prac-

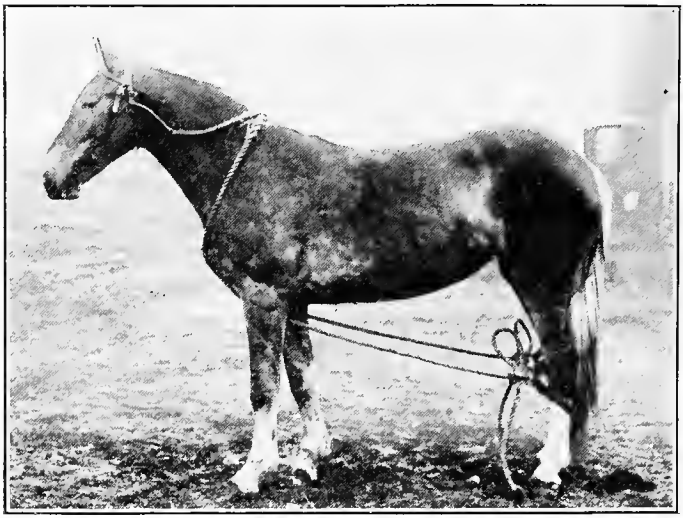

FIG. 133.—ARRANGEMENT OF BREEDING HOPPLES

tically no outside crosses have been made. This has enabled the farmers to select suitable mares and to adequately develop their progeny. The result is that Canada has but one type of draft horse, and it is a good one, showing to a marked degree the characteristics of the pure-bred Clydesdale.

The individual farmer will do well to cast his lot with the majority of his neighbors and breed the same type that they are breeding, even though that type may not be the one that best suits his fancy or even the one that is best suited to the district.

The process of breeding.—The stallion should paddock hands of a caretaker who understands his work south. oughly. Englishmen and Scotchmen, by virtue of vary training abroad, usually make the best grooms. is stallion standing for public patronage should have a properly constructed breeding plant. This may consist of an inexpensive shed with an earth floor on which to breed the mares. At one side of the shed erect a teasing stall in which to try the mares. The front and side of the stall should be boarded up solid for about 4 feet. This is preferable to the teasing pole, as neither the mare nor stallion can injure each other by striking or kicking.

No matter how gentle the mare may be, the breeding hopples should be used at time of service. It only takes a moment to adjust them, and they will avoid all accident. The hopples should be adjusted snugly so as to prevent the mare from stepping about. Many a valuable stallion has been injured when it was thought unnecessary to take this precaution. When the mare is in place lead the stallion from his stall, making him come up quietly and at right angles to her. It is better to train the stallion to mount from the side rather than from behind. Train him to come up quietly; do not allow him to tear all over the plant in his efforts to mount and do not allow him to nip at the mare.

CHAPTER XXVII

THE BROOD MARE

The mare used for breeding purposes should receive careful attention. This need not lessen her usefulness as a worker to any considerable extent, but is very important, as the wellbeing of both mare and foal depends upon such attention.

Care of brood mare.—In our attempt to favor the mare in foal, we often subject her to very unfavorable conditions. Often she is placed in a stall, fed the most nutritious of foods and denied exercise, particularly in winter, as we are afraid she will slip and injure herself or the foal. Under such conditions she soon stocks up, the legs become swollen and stiff, she takes on fat rapidly and becomes soft and flabby, all of which serve to increase the difficulties at parturition time. It is a much better plan to keep the mare in foal at moderate work, even up to the day of foaling, as this will provide the needed exercise, which is so essential to the wellbeing of both mare and foal.

Where a large number of brood mares are kept, it is often impossible to supply work for them, particularly in the winter season. If possible, it is a good plan to provide each mare with a box stall, at least 10 by 12 feet square. Each stall should be arranged with a door facing the south and opening into a small paddock or yard, so that each mare may have her own exercising ground. This will provide for exercise and avoid many distressing accidents, as mares in foal are usually quarrelsome and often injure each other when exercising two or more in a paddock. Where box stalls and small yards are not practical, a good, tight shed well protected on the north and west, but open to the south, will do very well for mares, if they have plenty of room, particularly

if the climate is not too severe. A spacious paddock should be arranged in front of the shed, facing the south.

Productive period in brood mares.—Mares vary widely in fertility, but the most productive period is from four to 12 years of age. In exceptional cases, however, this period may be extended both ways. Occasionally a filly will breed freely at two years of age, thus foaling her first colt at three; and, as we have already seen, Old Fanny Cook produced 15 living foals, giving birth to twins at 22 years of age, and there are many similar cases, especially among the lighter types.

Breeding two-year-old fillies.—Among practical horse breeders there is much difference of opinion as to the advisability of breeding a two-year-old mare. Many persons assert that the breeding of a filly at so early an age tends to retard her development; that she will not make so large or vigorous an animal as she otherwise would and that the foal is handicapped in its development because of having an immature dam. On the other hand, there are breeders who state that early pregnancy has a tendency to stimulate the development of the dam, to increase the fertility, and that the first foal, if from a filly at least three years of age, stands just as good a chance as the first foal from a mature mare.

From experience, it seems that the practicability of breeding a two-year-old filly depends on at least three factors: The breed, the individuality of the mare and the object sought. As a rule, horses of the heavy type mature younger than those of the light type. A draft filly at two years of age is often as mature as a trotting, running or saddle filly at three years of age. Individual mares differ in the way they mature, as a smoothly turned, neat and well-finished one develops much younger than a rough, coarse and growthy individual. Maturity is influenced by the feed and care. A filly that is kept growing continuously from birth will mature earlier than one imperfectly cared for and which receives a set back

FIG. 134.—PERCHERON MARES OF EXCELLENT TYPE FOR BREEDING

each winter. Finally, if breeding pure-bred animals, and the object sought is to improve the strain, the advisability of breeding a two-year-old filly would be questionable. On the other hand, if working with grades and the object is to produce draft horses for the market, there is no reason why fillies cannot be bred at two years of age if they are well grown and mature, and their owner is willing to feed and care for them properly during their pregnancy.

Perhaps one reason for much of the discussion as to the wisdom of breeding a mare at two years of age is from the fact that fillies at this age breed with much difficulty. From practical experience it seems that only about one filly out of four will conceive at so early an age.

Breeding aged mares.—At about 12 years the productive powers of many draft mares begin to wane, although some breed freely for a much longer period, particularly if they have been bred continuously from their maturity. As a rule, the lighter types retain their productive powers longer than the heavy types, although it is rarely profitable to keep a mare for breeding after she is 15 years of age.

Season of the year to breed.—Mares breed naturally in the early spring. At this season their breeding condition is more readily observed and they conceive more frequently than at any other time during the year. While the spring of the year is the natural breeding season, on many farms it is inconvenient to do so, because of the season's work, this being the busiest time of the year. This often necessitates breeding the mares so as to have the colts come in the fall.

Spring foals.—When convenient the spring is the proper time to breed the mare, as this is attended by many advantages. Not only is the mare's breeding condition more readily noted and her chances of conceiving much greater, but the foal comes at a time when it is much more easily managed. The housing is simplified, for if the weather is warm the mare and foal may be

FIG. 135.—BELGIAN MARES OF GOOD CONFORMATION

turned to a small paddock or pasture. If the mare is worked during the day she should be fed her evening meal, before going to pasture, as she needs the more nutritious feed, the grass being too succulent to meet the demands made upon her system. The grass she eats will serve to keep her in good physical condition and stimulate the flow of milk. This gives the foal the range of the field that it may take the much-needed exercise, without which no foal can develop endurance. Soon the foal will learn to nibble the grass, and this will prove very beneficial, as grass is a very good supplement to milk for a suckling colt. If the foal is given a little grain at the same time the dam receives her ration, it will thrive and develop in a manner very difficult to equal with a fall colt.

Aside from the inconvenience of the foal while working the dam, the chief objection to a spring colt is that he must be weaned in the fall just about the time of going on dry feed. At this time the colt must receive extra feed and attention or he will lose flesh and perhaps receive a setback that will retard his future development and usefulness.

Fall foals.—On grain farms the pressing work begins in March and continues until August, while in dairy districts where there is much hay to harvest and silos to fill it may last until October. When fall foals are to be raised the mares should be bred so as to foal as soon as convenient after the season's work, providing the foals do not come when flies are cruelly annoying. Time of breeding and other details will be modified by circumstances.

While the mare is not so likely to breed in the fall as in the spring, due, in part at least, to her thin condition after the summer's work, yet by increasing the food, especially the grain ration, by blanketing, and by moderate and regular exercise, the desired results can often be attained. The bowels should be kept free from constipation by feeding moderate amounts of succulent food. In short, make the conditions as springlike as possible.

If the foal comes in the winter it will need extra warm quarters and extra attention. The dam will need milk-producing foods, such as clover or alfalfa hay, oats, bran and a few carrots, if available. She should be exercised regularly. If one has succulent food, such as carrots, and provides sufficient exercise for mare and foal, it is possible to raise a winter colt that will be a strong rival to the average spring colt, but extra care must be given.

Breeding the mare.—Do not change the habit or work of a mare at breeding time, but keep her as she was before the service. Often work mares are bred and turned to pasture. This is poor practice, as the sudden changing of a mare from dry grain and hay to pasture, and from work to idleness will so upset her system as to render conception difficult. In like manner, taking a mare from pasture and giving her a diet of grain and hay will have a similar result. The quieter a mare is kept at time of service the better it will be for her. If possible long drives to and from the stallion should be avoided. When it is desired to breed to a stallion located at some distance, if possible, arrangements should be made to leave her near him for a time.

Breeding condition.—While mares differ widely in the recurrence of their breeding condition, this difference is not so great as to render a general rule inapplicable. A mare bred on the ninth day after foaling will usually conceive, and if she is healthy and has received no injuries in giving birth it is the practice to breed her at this time. When she should be returned to see whether she has conceived is a much-discussed question, due to the fact that mares differ in this respect. The horse breeder should make a study of the individuality of his mares so as to be able to return them at the proper time. In common practice the mare is returned on the twenty-first day after first service, and every seven days thereafter for at least one month, particularly when the mare is a valuable one and the owner wishes to make sure she is in foal.

Some mares are shy breeders and are never observed to be in breeding condition. If it is desired to breed such a mare she can occasionally be brought around by hoppling her securely and then breeding her. In approximately three weeks from this service she may be observed to be in breeding condition, when she should be bred again. On the other hand, there are many mares that will freely be served even when in foal, and in some cases up to the time of foaling.

Barrenness in mares.—Some mares come into condition and breed normally, but fail to conceive. While there are many causes of barrenness, some of which are well understood and easily prevented, there are other causes not so well known and perhaps beyond the control of the breeder. Chief among the known causes are: Late breeding; lack of exercise; overfeeding and mares in too fat a condition; underfeeding and mares in too thin a condition; lack of proper food and the like. Thus, mares not bred until late in life are difficult to impregnate for the first time. This is particularly true of hard-working mares. This is due, no doubt, to the long inactivity of the generative organs.

Perhaps the most common cause of non-breeding is the excessive feeding of foods too rich in carbohydrates, particularly corn, which is very fattening. This also increases the dangers attending parturition, such as milk fever, difficulties in foaling, and the like. Breeding animals that are fed such rich and stimulating foods should receive an abundance of exercise. The other extreme—poor feeding and hard work—is equally as likely to cause barrenness, as the system is weakened by the lack of sufficient nutrition. On the other hand, there is a long line of causes of barrenness over which the breeder has little or no control, such as derangement of the female organs, diseased ovaries, tumors, inflammation, and the like, which lead to the destruction or expul-

sion of the semen before conception, or soon afterwards.

To reduce barrenness among brood mares, avoid all causes which may have a tendency to produce it. Feed a moderate amount of clean, nutritious food and provide the mare with sufficient exercise. Keep her in good health and if she is normal she will conceive. If she is not normal or is unthrifty, she either may not conceive at all or only occasionally, and even then there is likely to be difficulty.

Abortion in mares.—Perhaps many mares thought to be barren conceive freely, but abort soon after conception. Either difficulty is serious, as they prevent living offspring and thus render the mare worthless as a breeder. Abortion may be brought about by any cause that very generally disturbs the mare's system, such as the feeding of too stimulating a ration or the reverse, the feeding of certain harmful materials as ergot of rye, smut of corn or other grain, and the drinking of filthy stagnant water, iced water as well as the eating of iced grasses and other indigestible materials. In addition, abortion may be due to a number of more or less direct mechanical causes, as falls, blows, overwork and violent exertion, traveling on muddy roads, soft, plowed ground or jumping fences, ditches, and the like.

As in barrenness, abortion can usually be prevented by avoiding all causes which may have a tendency to produce it. The same precautions should be taken as suggested for barrenness. When all measures fail and miscarriage results, all that can be done is to assist in the removal of the fetus and its membranes, as in ordinary parturition. At this time the mare should have extra care. She should be placed in a roomy, well-lighted and well-ventilated stall, and fed easily digested food, as it is essential to avoid constipation, diarrhea, indigestion and the like. The mare should never be bred on the ninth day after a miscarriage. Let her go over at least one period.

THE PREGNANT MARE

The management of the pregnant mare should have for its object the feeding of such a ration as will supply her demands for energy, and in addition allow ample nourishment for the development of the foal, both before and for a short time after birth, together with such a regulation of the work as will protect the mare from becoming tired, overheated, or injured in any way. The breeder who is painstaking and can accomplish this will experience little or no difficulty in managing brood mares before, during

FIG. 136.—BROOD MARES SHOWING CONFORMATION, SOUNDNESS AND UNIFORMITY

and after parturition. There is no secret in raising colts further than the feeding of a moderate amount of nutritious food and providing sufficient exercise to keep the mare and foal in perfect health.

Working the pregnant mare.—As stated, moderate work is not only harmless, but positively advantageous to mares in foal, provided proper care can be taken not to overload them. It is much better than to keep them tied in the stable, for in that case they suffer for want of exercise. Notwithstanding, popular opinion to the contrary, moderate work is better for brood mares than to

permit them to run at large in the fields, where they are exposed to accident resulting from racing, playing or fighting with each other. Pregnant mares are usually quarrelsome, and abortion frequently occurs from injuries received at the heels of other horses. If proper care be taken, the mare can be used safely at the ordinary work of the farm up to the very day of foaling. As foaling time approaches, however, it is important that the work be not heavy or the pace rapid. Further, the pregnant mare must not be fretted by the other horses, or by rough, inexperienced hands.

Feeding the pregnant mare.—The food of the pregnant mare is of most importance. The quality of the ration is of as much importance as the quantity. Fat production is to be avoided, and the formation of blood, muscle and bone induced. Foods rich in protein and ash, such as oats, bran, clover and alfalfa are preferred to starchy foods, such as corn and timothy hay. A very good ration for the pregnant mare is as follows: Four parts ground oats, four parts of wheat bran or its equivalent, and one part of linseed meal, with bright clover and alfalfa hay for roughage. If this ration should prove too laxative discard the linseed meal, or if too constipating give a bran mash occasionally. By the use of the proper foods, the bowels should be kept in good condition.

The ration of the mare should be reduced just before and for a short time after foaling, and made more laxative by the addition of a succulent food, as carrots or an occasional bran mash. This should be continued until mare and foal recover from the ordeal incident to birth.

The gestation period.—The mare carries her foal about eleven months, more accurately perhaps 340 days, although it may vary greatly either way. Fillies have been known to drop perfectly healthy foals at 300 days from time of service, while older mares have gone 400 days and given birth to living foals. The statement that male foals are carried longer than female foals lacks con-

firmation. Because of the uncertainty of the period, the mare should be watched closely from the tenth month until parturition. Place her in a large, well-lighted, well-ventilated box stall, free from projections on which she may injure herself or the foal, and in a quiet section of the barn. It is important that this stall be thoroughly clean and freshly bedded. It is a good plan to scatter a little lime about the floor before the bedding is put down.

TABLE SHOWING PERIOD OF GESTATION—MARES 340 DAYS

Jan.	1	3	6	9	12	15	18	21	24	27	30	
	6	8	11	14	17	20	23	26	29	1	4	Jan.
	1	3	6	9	12	15	18	21	24	27		
	6	8	11	14	17	20	23	26	29	1		Feb.
Mar.	1	3	6	9	12	15	18	21	24	27	30	
Feb.	3	5	8	11	14	17	20	23	26	1	4	Mar.
Apr.	1	3	6	9	12	15	18	21	24	27	30	
Mar.	6	8	11	14	17	20	23	26	29	1	4	Apr.
May	1	3	6	9	12	15	18	21	24	27	30	
April	5	7	10	13	16	19	22	25	28	1	4	May
ne	1	3	6	9	12	15	18	21	24	27	30	
ıy	6	8	11	14	17	20	23	26	29	1	4	June
y	1	3	6	9	12	15	18	21	24	27	30	
June	5	7	10	13	16	19	22	25	28	1	4	July
Aug.	1	3	6	9	12	15	18	21	24	27	30	
July	6	8	11	14	17	20	23	26	29	1	4	Aug.
Sept.	1	3	6	9	12	15	18	21	24	27	30	
Aug.	6	8	11	14	17	20	23	26	29	1	4	Sept.
Oct.	1	3	6	9	12	15	18	21	24	27	30	
Sept.	5	7	10	13	16	19	22	25	28	1	4	Oct.
Nov.	1	3	6	9	12	15	18	21	24	27	30	
Oct.	6	8	11	14	17	20	23	26	29	1	4	Nov.
Dec.	1	3	6	9	12	15	18	21	24	27	30	
Nov.	5	7	10	13	16	19	22	25	28	1	4	Dec.

The upper figure in each pair of horizontal lines represents date of service, the figure beneath it, with the month designated in the margin, shows probable date of parturition. A mare bred January 1 should foal December 6.

Foaling time.—There are certain signs of the near approach of parturition that rarely fail. The udder may become much distended some time before foaling, but the teats seldom fill out plump to the end more than four or five days before the foal is born. By many persons the appearance of wax on the ends of the teats is considered a certain sign. This generally appears not earlier than 48 hours before the foal comes. In some cases, however, the teats may discharge a watery exudate for days before the mare foals. About one week or 10 days before foaling there is a marked shrinking or falling away of the muscular parts at the top of the buttocks and back of the hips. On the other hand, occasionally a mare may give birth to a foal without any of these signs.

When birth is normal, let both mare and foal alone, as they will come through the ordeal all right. In normal presentation the forefeet appear first with the bottom of the hoofs down, and then the nose (Fig. 185). It may be necessary that a caretaker be near at hand to render assistance if need be, but the mare should not know of his presence. The navel cord of the foal should be disinfected at once. To do this some persons use a saturated solution of boracic acid, and then dust the cord with boracic acid powder.

When birth is difficult, or if there is an abnormal presentation a veterinarian should be summoned at once, as difficult parturition is likely to prove fatal to the foal.

Mare after foaling.—When birth is normal, the mare will usually tend the foal, though it may be necessary to aid him to get the first meal. When the mare has rested offer her a drink of gruel made from a pound of fine oil meal in half a bucket of water from which the chill has been taken. The mare should be given a few days' rest, though she should be exercised after the first few days, particularly if she has been at moderate work up to the time of foaling. This is important, as otherwise the foal will not thrive. If all is well the mare may be put to moderate work the ninth day after foaling.

CHAPTER XXVIII

THE FOAL

It is important that the young foal get the first milk from the dam. The first milk, often called colostrum, looks thick and yellow, and differs materially in composition from the subsequent milk. It is a natural purgative for the removal of the material that has accumulated in the foal's digestive tract during the last few days of his development. The prompt removal of this material is essential to the life of the foal. Thus, if the youngster is unable to stand and nurse, he should be aided to find the teat and to obtain his first meal.

The foal that makes his appearance normally, and is able to stand and nurse, needs but to be let alone as long as mare and foal are both doing well. The young foal will be better for it. By regulating the food and the exercise of the mare, the foal may be kept thriving and in the pink of condition without any special attention.

Ailments of the young foal.—There is a high death rate among foals, due largely to lack of understanding on the part of the caretaker. It sometimes happens that the new-born foal cannot breathe because of the membranes surrounding the head. In such cases the membrane should be broken with the hand. Occasionally a new-born foal does not establish the function of respiration. In such cases the body should be rubbed briskly. Soon after birth many foals are troubled with digestive disorders, that must be remedied at once or they will prove fatal. Again, they are sometimes troubled with an infectious navel disease which usually proves fatal to the young foal. Practically all of these troubles can be avoided if proper precautions are taken.

Constipation.—During the last few days of fetal de-

velopment there collects in the digestive tract of the foal a yellowish, rather hard, waxy substance called meconium. This fecal matter must be passed soon after birth or it will prove fatal to the new-born foal. If the digestive tract has not been cleaned of this material within 12 hours, and the youngster presents a droopy, listless appearance, such as eyes not bright, ears lopped over and the like, something must be done to stimulate the

FIG. 137.—ARABIAN MARE AND FOAL

action of the bowels. This usually can be done by giving internally two ounces of olive oil or castor oil, and by an injection of warm water into the bowels. The oil must be given carefully to avoid strangling the foal. The water used in the injection should be at blood heat and have added to it a little glycerine. Inject gently into the rectum with a common two-ounce hard rubber syringe, taking care not to rupture the tender membrane. This

will lubricate the passage and stimulate the bowels to action. The injection may be repeated each hour until the matter is passed, which should be within five hours from the time of giving the oil.

Diarrhea.—Young foals are often troubled with diarrhea or scours, which often proves fatal soon after birth. There are a number of causes of this disease, perhaps the chief one being changes of an unknown character in the composition of the mare's milk, due to poor health, lack of exercise, or to the mare becoming fretful when kept away from the foal for a time soon after foaling. The foal feeding on this changed milk induces indigestion and diarrhea. Some mares give a very large flow of milk, particularly when fed rich and stimulating food, and if the foal is permitted to take it all, digestive disorders and diarrhea are likely to result. The same often happens in early spring when the mare is pasturing on a rank growth of succulent grass. Other causes are the non-removal of the fecal matter, mare and foal confined in unclean stables, and the like.

The treatment is the avoidance of conditions likely to cause such disorders. If the dam is properly housed, fed and exercised there is very little danger. At the first appearance of such trouble, we should attend the foal and remove the cause, for even then it may be too late. If it is due to an oversupply of milk, the dam should be milked in part by hand. Never give an astringent with a view of cutting off the discharge, as the trouble is probably caused by an irritant in the stomach or bowels which must be removed before a cure can be effected. The best plan in all such cases is to expel the disturber with a laxative, such as two ounces of olive or castor oil, and later when the irritant has been removed to check the discharge.

Navel infection.—Young foals are very commonly troubled with navel infection or joint ill, which is a very fatal disease, particularly after the joints become af-

fected. This disease is due to filth germs that gain access to the body of the foal by way of the open umbilical vein of the navel at birth. Soon after these germs enter the navel, they set up irritation and inflammation. The navel becomes enlarged, pus forms and is absorbed into the circulation. Abscesses form in all parts of the body, notably in the joints of the limbs, and at the throat and poll.

As with digestive disorders, the treatment is the avoidance of conditions likely to produce the disease. It should be understood that simple hygienic measures will prevent all such diseases. The box stall in which the

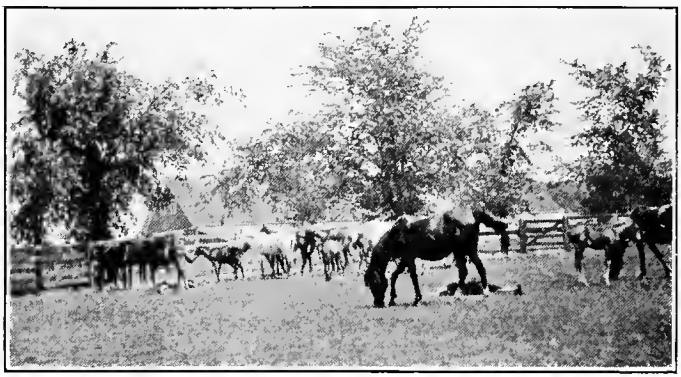

FIG. 138.—MARES AND FOALS AT PASTURE

mare foals should be scrupulously clean, well lighted and well ventilated. It should be well bedded with clean, fresh material, for which straw or shavings is best. To make the stall sweeter a little lime should be scattered about the floor before the bedding is put down.

FEEDING THE YOUNG FOAL

If the dam's milk is insufficient to promote a healthy, vigorous growth in the foal, additional food should be provided. For this purpose cow's milk is best, and the

poorer in fat the better, as mare's milk will average only about 1½%, while that of the cow contains more than twice as much fat.

Modified cow's milk for foals.—Occasionally it becomes necessary to raise a foal entirely independent of the dam. In such cases the cow's milk must be modified and care must be exercised not to give too much at one time. To a pint of fresh milk add half a teacupful of lime water, in which has been dissolved a dessertspoonful of white granulated sugar. Warm the mixture to blood heat. Let the foal have half a teacupful every hour at first. As the foal grows older this amount should be increased and the frequency of feeding decreased, first to 12, then to nine, six, and, lastly, to four times per day. This requires patience and takes time, but must be done. The object is to feed the foal all he will drink, and to feed him so frequently that he will not require much at a time.

Feeding grain.—As soon as the foal is old enough, he should be taught to eat grain. He will begin to munch in the grain and hay at 10 days to two weeks of age, and should be encouraged to eat. A small handful of bran or oatmeal, to which a little brown sugar has been added, is good to get the foal in the habit of eating grain. A grain mixture consisting of half bran and half oatmeal by volume, makes a very satisfactory food for the sucking colt. The youngster should be given all of this mixture that he will consume with a relish.

If it is necessary to feed milk after the colt is two months of age, skimmed milk should be substituted for fresh cow's milk. This should always be given when sweet. If the colt is troubled with constipation add a little oilmeal to the grain ration. This meal can be fed with profit to growing colts, as it furnishes a large proportion of muscle-forming and bone-forming food.

Weaning the foal.—When properly managed, the foal can be weaned without loss in weight. This is largely a matter of preparation, and the simplicity of the weaning

process depends on the thoroughness of the preparation. The colt that has been accustomed to grain as suggested, and that has been permitted to take increasingly more as he grew, has learned to rely on his own resources. Thus, when the time comes for complete separation from the dam there will be very little if any setback, providing he is given all the grain he likes and is provided with an abundance of fresh drinking water. On the other hand, if the foal must learn to eat after being deprived of the dam's milk, he will require time to get accustomed to the new condition, which will of necessity prove a heavy drain upon the system. The new quarters where the weanlings are confined should be such that they cannot injure themselves while fretting over the separation.

FIG. 139.—PERCHERON WEANLING, WELL BRED AND WELL FED

At this time the udder of the mare requires extra attention. When it becomes so full as to cause her uneasiness, part of the milk should be drawn, but she should not be milked dry. If the milk is all withdrawn it will take longer to dry her.

Age to wean the foal.—In common practice colts are usually weaned at four to six months of age, depending on the conditions. In the case of mares that have been bred soon after foaling, it is best to wean early, so that they will have time to recuperate and to nourish the fetus. If for any reason the mare or foal are not doing well, it is perhaps best to wean rather early. On the

other hand, if the mare has a full flow of milk and her services are not needed, and if it is desired to push the foal to his maximum growth, there is no reason for weaning under six months of age.

When dam and foal are separated, leave the foal in his accustomed stall and take the dam out of sight and hearing. This separation should be complete. If they are permitted to see, hear or smell each other again all that has been gained is lost, and it will be necessary to begin over again.

MANAGEMENT OF THE WEANLING

Weanlings should have snug quarters during the first winter. Feed them ground oats, barn and corn meal, one-third each by weight, to which a little oilmeal has been added to keep them in good physical condition. Feed only the best hay, clover or alfalfa preferred, and always avoid that which is dusty or moldy. Give them all they will clean up and come back hungry for the next meal.

Exercise and development.—The colt needs an abundant opportunity for exercise in the fresh, pure air, uncontaminated by stable odors, as this is essential to a healthy development. It is not sufficient that he be led out at stated intervals for exercise. He needs the opportunity to romp and play, that he may extend his muscles to their utmost capacity, expand his lungs to their very depths, and send the blood coursing through his veins with much vigor. This is essential to a healthy, robust development of heart and lungs, bone and muscle, and nowhere can it be obtained in so great perfection as in the freedom of a lot or field.

The colt that is confined to a stall grows up a stiff, clumsy animal, deficient in stamina and vigor. And this for the want of that which is so free—fresh air and exercise.

Care of the colt's feet.—The feet of a growing colt require constant attention, otherwise they will not always

grow out full, strong and perfect in form. On sandy soil, the hoofs wear off as fast as necessary, to keep them in fair proportion, but the wearing is not even. The feet should be carefully inspected once each month, and all irregularities corrected. It will often be necessary to shorten the toes. This should be done with a rasp, which is the only instrument that should be used on a colt's foot. The frog needs special attention, for if it gets out of contact with the bearing surface the foot will rapidly lose its shape, the heels will contract and the walls at the quarter become brittle, weak and easily split both from above and below. To avoid such irregularities, keep the walls rounded at the ground surface, the toes short and the frog prominent.

Age to castrate male colts.—It is customary to castrate the colt when he is between one and two years of age. The work for which the colt is required, as well as the individuality, are factors to be considered in determining the proper age. The longer the colt is left entire, the more muscular in appearance and the more courageous he will be. Thus, if the colt is rather undeveloped, especially about the head and neck, and rather timid in his nature, he may be left entire six months or even a year longer than if he is overdeveloped in these parts and inclined to be lively and vicious.

CHAPTER XXIX

PRACTICAL MULE BREEDING

While in the breeding of mules the same general factors are to be considered as in breeding horses, yet there are a few peculiar differences worthy careful consideration. Chief among these peculiarities are the method of obtaining the sire, as well as his management from the time he is foaled until maturity.

Number of mules produced.—The number of mules bred in the United States is increasing very rapidly. According to the thirteenth census there were approximately 3¼ million mules in the country in 1900, while in 1910 there were about 4¼ million. This increase is due to the efficiency of the mule as a beast of burden. He possesses a few outstanding advantages over the horse, chief of which are his resistance to disease, largely because he seldom eats more than is good for him; his pluck, perseverance and steady habits; his fast walk; and his long life, the mule being a longer-lived animal than the horse.

Mule-breeding states.—The geographical distribution of mules is different from that of horses. Although the use of mules is rapidly increasing in the North, it is in the South that they have been found particularly useful. In 1910 there were more than 12 times as many horses as mules in the North, while in the South there were only about one and one-half times as many. Of the 313,196 yearling mules in 1909, practically none were in the New England states; less than .5 of 1% in the middle Atlantic states; 3.3% in the South Atlantic states; 46.2% in the north central states; 44.9% in the south central states; and 5.1% in the mountain and Pacific states. Missouri,

Texas, Kansas and Oklahoma lead all other states, each possessing more than 10,000 yearling mules in 1909, while Iowa and Illinois, the two leading horse-producing states, which numbered 158,679 and 138,447 yearling horses respectively, possessed but 1,482 and 7,202 yearling mules respectively, at the same time. Kentucky and Tennessee stand high among the mule-producing states, and are particularly noted for raising mules of style and quality.

BREEDING JACKS AND JENNETS

Since the jack is sire of the mule, it is necessary to consider the breeding of jacks and jennets in any discussion of mule breeding. While we have no data as to the extent of jack and jennet breeding in the United States, it is very limited, as the thirteenth census reports only 105,698 jacks and jennets. The leading mule breeders rely largely upon imported jacks, although with the increasing popularity of the mule there is likely to be an increase in the number of jack-breeding farms.

FIG. 140.—CATALONIAN JACK

Selecting breeding stock.—In the choosing of jacks and jennets, equally as much care should be exercised as in the case of breeding horses. The same general principles of breeding apply to jacks and jennets as to stallions and mares. Lack of numbers makes rigid selection impossible, but improvement is not possible unless superior animals are mated.

Select animals that are typical of the breed and that display jack characteristics. Choose the animal with a long, thin, bony head and long, tapering ears attached gracefully to the head. The neck should be of medium length and well attached at the shoulders, which should be well laid in and not too rough. The body should be smooth and well turned. Breadth in hips and pelvis is very essential, particularly in the jennet. Many jennets are so deficient or narrow in the pelvis that they often experience great difficulty at parturition time. The legs should be flat and clean, with large joints, and the feet should be large and deeply cupped.

In size, the breeding animals should be large for the breed and well proportioned. Large jacks often lack in proportion and are often clumsy. Both of these faults must be guarded against. The action should be free and easy as well as regular and straightaway. The walk should be rapid and regular. The color is a very important character in jacks and jennets, notably in the United States, where a good black with distinctively light points is preferred. Dun, yellow, blue, and the like, are discriminated against. Perhaps the most important characters to be considered in selecting jack stock are the color, size and action.

The pregnant jennet.—The same suggestions made for the pregnant mare apply to the jennet (p. 283). As it is not customary to work jennets in this country, they must be provided with facilities to take the much-needed exercise. When in season, the pasture fills this need. If the weather is unfavorable, the jennet should be placed in a box stall, adjacent to an exercising lot and the door of the box stall left open except in very severe weather. To avoid all risk from accident each jennet should be kept by herself.

The jennet carries her foal longer than the mare, often well up to 12 months. As the time of foaling approaches the jennet must be watched closely, and an attendant

must be with her when the foal is born. This is important. When the foal is born he may have the membrane over his head and nostrils, and if this is not torn and removed, he will smother. The navel cord is rather tough and sometimes does not break. In such cases, it should be tied with a silk or flax thread and then cut three or four inches from the navel. Never cut the cord before tying. Sometimes foaling jennets are troubled with sore, tender and inflamed udders, due to the large amount of milk they contain. When such is the case, the jennet will not allow the foal to suck. She will kick and bite him, and he may starve if not looked after properly. The jennet must be carefully milked and the udder bathed in salt water to relieve the inflammation.

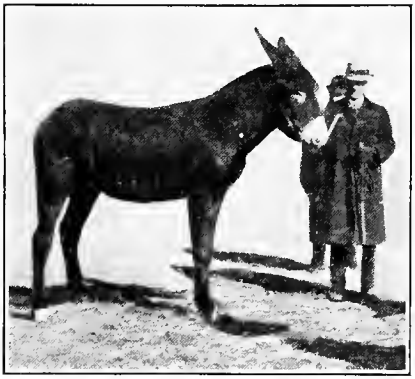

FIG. 141.—JACK COLT FIFTEEN MONTHS OF AGE

While mares usually breed on the seventh to the ninth day after foaling, jennets breed much later, probably about the twelfth to fourteenth day. As with mares, if they fail to breed at this time, they are not likely to mate while nursing the foal. A few days after weaning, however, and the mare or jennet dried off, they are likely to come into heat, particularly if they have been well cared for and are in a thriving condition.

The foal.—The jack and jennet foal should receive much the same care as that suggested for the horse foal (p. 287), although jack stock is very tender when young and should receive vigilant attention. These foals are

more or less subject to springing of the forelegs when young. According to Knight, who has had large experience in raising jacks, this difficulty results from the foal's long legs. Thus, when the dams are low, and the foal is compelled to stoop and suck, the forelegs are often cramped in such a position as to increase their liability to injury. At an early age the bones are very soft and

FIG. 142.—SPAN OF PRIZE MULES

easily sprung. The difficulty is also noticed in young foals feeding on pasture. The youngsters are required to put too much weight on the forelegs in order to reach the grass, and this may result in injury to the joints. Usually the knees spring in or out, but sometimes the ankles give way and occasionally the arm joints are injured.

This difficulty may be so serious that Knight suggests placing the foals in the stable and feeding them suitable food. Fresh green grass may be fed in the stable, thus

avoiding the exposure of the limbs by grazing. When the difficulty is due to a low dam, the youngster may be placed in the stable and fed on modified cow's milk, much as suggested for feeding modified cow's milk to horse foals; or the milk from the dam may be used, as some jennets give large quantities.

Raising a mule-breeding jack.—The jack is peculiar in his habits. He will not serve both mares and jennets. In fact, he will seldom serve a mare if reared along with a jennet. In raising mule-breeding jacks this is a factor of much importance. To mate with mares, a jack must be raised with mare colts and not permitted to smell a jennet until well trained to breed mares. If permitted to serve a jennet, he will often refuse to serve mares, and his usefulness as a mule breeder is at an end.

MULE BREEDING

As we have seen, the mule is a hybrid, and results from crossing a jack on a mare, the reciprocal cross being known as a hinny. The latter is seldom seen, because the stallion has an aversion to the jennet and will not often mate with her. It is asserted that the hinny takes more of the characters of the horse, the head being neater and the ears shorter than the mule, the hair in the mane and tail heavier and the foot larger. The bray is like the horse.

Selecting mule-breeding stock.—Formerly very little attention was given to the choosing of either sire or dam in mule breeding. Thus, the mule of a decade ago was a small, ill-tempered and inferior animal, unsuited for most kinds of work. These early specimens were at once the contempt of all horsemen. Even though the modern mule is one of the most efficient working animals we have, he is held in more or less common prejudice because of the inferiority of his early brother.

Since the same general principles of breeding apply to the mule as to the horse, the same care should be exer-

cised in selecting both the jack and the mare, as suggested for the stallion and mare (p. 268). The market value of the mule will depend largely upon his size, conformation, quality, action and color. These factors should be taken nto consideration in selecting the mule-breeding stock. Many breeders have fallen into the grievous way of considering a mare for mule breeding when no longer suited for horse breeding. For some reason they seem to expect such a mare to produce a good mule. This is exactly the cause of much of the prejudice against mule breeding. Not until due consideration is given the selection of both jack and mare can we hope to raise our mule stock to the highest degree of efficiency obtainable. This applies to the individuality of both parents as well as to eir suitability for mating.

The type of mare to select will depend largely on the class of mule it is desired to produce. In breeding mules it is as important to study the market as in breeding horses. If it is desired to produce a light mule, such as mining mules, sugar mules, and the like, then mares of the light type should be selected. On the other hand, if the object is the production of draft mules, then the mares should be of the heavy or draft type (p. 320). The jack should be selected from the same point of view.

Mare and mule foal.—In general, the care of the mare and mule foal should be the same as that suggested for the mare and horse foal (Chapters XXVII and XXVIII).

CHAPTER XXX

BREEDING HORSES FOR FARM AND MARKET

Since the mass of horses that supply our markets and do our work are produced upon farms, we will consider the breeding of horses for farm work and for the market.

Farm breeders' limitations.—The farmer should understand from the beginning that his task is the production of common working animals. He should understand that it is not possible for him to successfully produce race horses, coachers and saddlers. The production of these types must be left to the horse breeder who has the capital, time and facilities to put his stock into market condition. This is important and must be appreciated if farmers are to succeed as horse breeders. No other class of horses has been so extensively produced by our farmers as a low grade of speed horses, that is often so nervous as to be worthless upon the farm and that is not wanted upon any market because of the small size. True, there is an occasional horseman who may be classed as a farmer, and who is making a success of breeding and fitting these light types, but if his business be carefully examined it will be observed that he is placing his major efforts into the breeding and preparing of horses, while farming takes second place.

While a well-bred and fast trotter or runner, a fashionably bred, well-educated and active coacher, and a well-trained and stylish saddler may command a fancy price, especially if a buyer can be located, yet the capital, time and skill required to breed and condition such animals are far beyond the average farmer. The production of these types is the work of skilled horse breeders, whose lives are wrapped up in their work, and who are located at great breeding establishments, where every circumstance favorable to development is provided.

THE FARMER'S HORSE

While the average farmer should not attempt to produce fancy or fast horses, because of his lack of capital, time and facilities, yet he has certain advantages as a horse breeder that should be recognized and that should shape his course. The farmer uses horses extensively, and while the most efficient type of horse will depend to some extent upon the nature of the farm work, yet only the more useful types can be properly employed, there being no work suitable for race horses, coachers and saddlers. On most farms there is a large amount of cheap feed, which puts the horse industry on much the same basis as the beef industry. Further, most farms are provided with an abundant range, which affords facilities for exercising and growing young stock. While there may be many exceptions, the general trend of farm work is toward the horse possessing considerable weight, much endurance and good action.

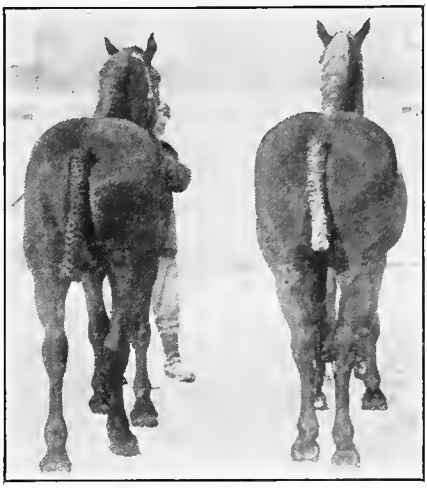

FIG. 143.—GRADE PERCHERON COLTS READY FOR MARKET

General-purpose horse.—On the average farm there is a variety of work to be done, some very heavy, as plowing, and demanding a heavy horse; some rather moderate as drawing produce to market, and demanding an active moderate-sized horse; and on the same farm there will be family driving, demanding a driving horse. To do

this variety of work many farmers have sought to produce a general-purpose horse, by which is meant an animal of all work. Since there is no breed of all-work horses, our farmers have taken it upon themselves to produce such animals by making various sorts of crosses. No doubt much of the indiscriminate crossing, which has resulted in our heterogeneous array of horse stock, was done in the hope of producing a general-purpose horse.

FIG. 144.—SHIRE STALLIONS SUITABLE FOR BREEDING FARM OR MARKET HORSES

It often happens that a breeder has made a very good start in developing a certain type of horse, say, a driving animal, when he concludes that the horse is too light to draw a plow and consequently mates with a draft horse in the hope of obtaining an offspring possessing the action of the roadster and something of the size and strength of the draft horse. On the other hand, another farmer may have developed a draft strain, when he concludes his animals are too heavy for the road and mates with a trotting horse. The offspring in either case proves a

disappointment, as anything in the horse line, except a useful animal, is likely to result from such crossing of types. It is this kind of breeding that results in animals with draft-horse bodies and trotting-horse legs, with big forequarters and small hindquarters, with big heads and little bodies, and with all sorts of irregular combinations. This method of breeding cannot be too strongly condemned, as it is a menace to the horse-breeding industry.

The draft horse for heavy work.—On grain farms, hay farms, stock farms, and the like, where there is much heavy work, such as plowing, dragging, harvesting and hauling, the draft horse is by far the most efficient. On such farms the draft horse finds his true home, and as there is work but a part of the year, the animals may be bred and raise a colt without serious inconvenience. The work is not so severe as to preclude the use of breeding mares. In fact, it is too expensive to keep geldings simply for the work they can do during the busy season. On farms of considerable size where three or more teams are kept one may be of the light type to take care of the light work and do the family driving.

The light horse for light work.—On dairy farms, small truck and fruit farms, where there is a minimum amount of heavy work, and where the necessity of reaching the market demands light active horses, the light horse is most efficient. On such farms of considerable size where it is necessary to keep several teams, one should be of the draft type to take care of the heavy work, since as these farms increase in size there is much heavy work to be done. Perhaps there will not be the same opportunity to breed these animals as on grain, hay and stock farms, but it makes a clear distinction as to the type of horse likely to prove the most efficient.

The one-team farm.—The same principle applies to the small farm as that suggested for the larger farm. If the major part of the work is heavy, the draft horse will prove the most efficient; while if the larger part of the work is

light, the light horse will be the most useful. In breeding farm horses these principles should be kept clearly in mind, as the horse of all work is a myth, and the attempt to produce him will prove a disappointment. Many a small farmer has come to grief because he provided for his family driving before his work and because he looked upon colt raising as causing too much trouble.

THE MARKET HORSE

Since the general farmer must keep more horses than he can provide with continuous work, in order that he may manage during the busy season, it has been suggested that he keep brood mares and raise colts, thus increasing the output from the farm. If the farmer breeds to a given type, as suggested above, this will prove a remunerative investment, although it will probably fail if he breeds indiscriminately and without regard to type. The farmer breeding horses in this way should make a careful study of the market requirements and market classes of horses, especially as applies to his local market and to his individual conditions.

Market requirements.—In breeding and fitting horses for the market there are a number of market requirements that should be carefully considered. Chief among these requirements are the general appearance, education and disposition, soundness, quality, condition, action, age, color and sex.

Appearance.—The general appearance of the horse has much to do with his market value. If able to shape himself well in harness, a very plain horse often makes a stylish showing and thus commands a good price. The animal should show spirit and energy, which accompanies good feeding. He should be well groomed, the hair short and sleek, lying close to the body and possessing a luster which is indicative of thrift. The general form must be indicative of strength, endurance and

longevity. The various parts should be in the proper proportion, thus improving the general symmetry.

Education.—The horse that is sent to market should be well educated to do the tasks he is expected to perform. The draft horse should be a fast walker and a good puller. He should be free from vice and bad habits. Among light horses education is of first importance, as the carriage, coach and saddle horse will sell in proportion to their training. In this day of motor-driven carriages too

FIG. 145.—BELGIAN MARES FOR BREEDING

much stress cannot be placed upon the horse's education. The disposition is also very important, as a kindly disposed animal will outsell any other. This is emphasized in the case of branded horses, which do not command as high a price as native animals because of their timid and uncertain disposition.

Soundness.—Perhaps no market requirement is of more importance than that of soundness. The market horse should be serviceably sound, or free from unsoundness that interferes with service. Such a horse may have slight blemishes, as small splints, puffs, and the like, but nothing is permitted that is likely to cause lameness or soreness in any way.

Quality.—In market horses quality is of prime importance. In animals of quality the muscles stand out prominently and are clearly defined, which aids in giving a horse finish and indicates endurance.

Condition.—The market horse should be in good condition of flesh. This applies more especially to animals of the draft type. Possibly this added flesh does not increase the horse's real value for utility and longevity, but the market demands it and the horse producer should supply it. Many horses find their way to market in poor condition, and some persons make a good profit in buying these thin animals, and shipping them to the country to be fitted, after which they are shipped back to the market and resold. Careful estimates place the value of horse flesh at 25 cents per pound on heavy horses weighing 1,500 pounds and upward. The farmer who is producing horses for the market cannot afford to let some one else reap this profit.

Action.—The action is an important market consideration, although not of equal importance in all types and classes of horses. With the single exception of soundness, action is by far the more important requirement in carriage, road and saddle horses. Perhaps too little attention is paid to action in heavy horses, particularly the rapidity of the walk. Many heavy horses are notoriously slow walkers and their efficiency is handicapped to that extent.

Age.—The market favors horses from five to eight years of age, depending on the maturity and the class. Heavy horses sell best at five to seven years old, but a well matured four-year-old will find a ready sale. Since the lighter types do not mature so early, and since their education requires more time, they sell better with a little more age, about six to eight years.

Color.—On the market, horses of solid color are preferred to those that fade. The demand is good for bays, browns, blacks, chestnuts, sorrels and roans. In light horses bays, browns and chestnuts sell best. In all classes matched pairs sell better than single horses. White is more or less discriminated against, as is "flea-bitten gray," "mealy bay," and the like.

Sex.—While the sex is of no great importance, the city trade favors geldings. This is due to the liability of the mare being in foal, and to the recurrence of her periods of heat, which are objectionable, as many mares are less efficient when in such condition. For the farm trade, however, mares are often preferred, as many farmers buy horses with the expectation of breeding them.

Breed.—The farmer who is raising horses with the expectation of marketing his surplus stock, is often at a loss to know what breed to choose. The breed is of less importance than the individual excellence. Fine specimens of any breed will find a ready sale at a good price. The farmer should study his local market closely, and if it favors any one breed he will do well to raise what his market demands.

Matched teams.—The importance of uniformity is emphasized by the fancy price a well-matched team of horses will command. The matching of horses is very profitable and many persons make a business of buying horses singly, then matching them, and selling them in pairs. To be successful, however, this requires native ability and skill on the part of the horseman as it is really a difficult task to match two horses in all of the important characters.

CHAPTER XXXI

MARKET CLASSES OF HORSES AND MULES

In our large horse markets, horses are classified according to the work they can perform. On any given market, a market class is a group of animals similar in type, height, weight and action. While classes go by a certain name all over the country, the kind of horse that is referred to in one part of the country by one name may be very different from the horse referred to by the same term in another section. Thus, the Boston wagon horse, the New York wagon horse and the Pittsburgh wagon horse are three different kinds, although they are all wagon horses. The same is true of practically all the classes, and the breeder who is producing horses and the feeder who is fitting horses for market should become familiar with the classes upon the market where his stock is to be sold.

MARKET CLASSES OF HORSES*

In this classification, horses are divided into classes, sub-classes and grades. The classes embody groups of horses of a general type. The sub-classes are divisions of the class and distinguish horses of a similar type, but slightly different in size, weight, or the use to which they are put. The grades of the various sub-classes refer to the quality, condition and action, the relative importance of which is not the same for all classes. The principal grades are choice, good, medium, common and inferior. The various grades will not be discussed because of the lack of uniformity in their application. The principal classes are draft horses, chunks, wagon horses, carriage

*Made up from Illinois Bulletin 122, and applies to the Chicago and St. Louis horse markets.

horses, road horses and saddle horses, to which may be added feeders and range horses.

Draft horses.—Horses of the draft class should be broad, massive individuals with symmetry of bone and muscle, standing from 15.3 to 17.2 hands high, and in good flesh, weighing not less than 1,600 pounds. The general form of the draft horse will vary somewhat according to the market under consideration. European markets, especially the British markets, demand a more upstanding draft horse, with a longer neck than is desired by American markets. New York, being a great shipping port, demands larger and more upstanding horses than any other city in the United States. This is because of the large wagons used and heavy loading for the docks. The large amount of business done and the long waits necessary to be made before a place can be had at the docks to unload, have caused merchants to adopt the use of heavy wagons, thus making a good demand for the large upstanding horse. On the other hand, the dray work of Boston being lighter than that of New York, smaller and lighter wagons are used, and consequently the demand has been for a low-set, smaller horse, although the conditions are rapidly changing and the demand is now for a larger horse.

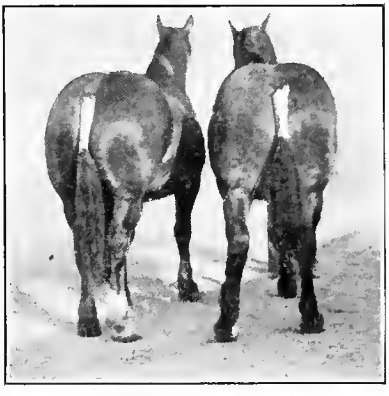

FIG. 146.—HEAVY DRAFT GELDINGS, WEIGHT, 4,000 POUNDS

The draft horse class is composed of heavy draft horse, light draft horse and the logger, all of which are of much the same general type. The heavy draft horse includes

the heavier weights of the draft class, standing from 16 to 17.2 hands high and weighing from 1,750 to 2,200 pounds. The light draft horse, which is similar in type, but smaller, stands from 15.3 to 16.2 hands high and

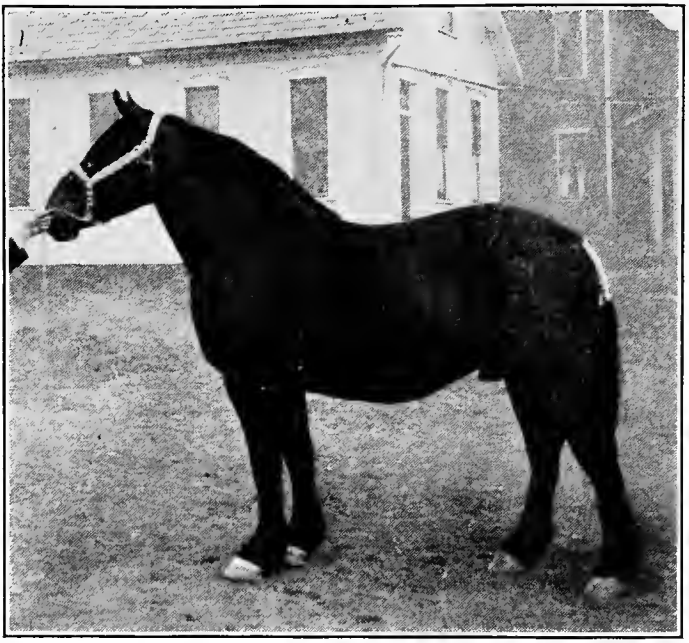

FIG. 147.—PERCHERON GRADE. WEIGHT, 1,925 POUNDS AT 4 YEARS OLD

weighs from 1,600 to 1,750 pounds. While 15.3 hands is accepted as the minimum height for light draft horses, occasionally 15.2 horses are included, although it should be understood that they are less desirable than taller ones, and border closely on the type known as eastern chunks. Loggers are horses of the draft class that were formerly bought to go to the lumbering woods, where they were used for logging purposes, hence the

name loggers. While they still fill this demand, they are also used extensively for other work. In such instances the trade demands a comparatively cheap horse, and yet must possess size and strength. Because of the price paid, this trade is usually compelled to take the plainer, rougher horses of the heavy draft type that are slightly blemished. Loggers, therefore, should stand from 16.1 to 17.2 hands high and weigh from 1,700 to 2,200 pounds.

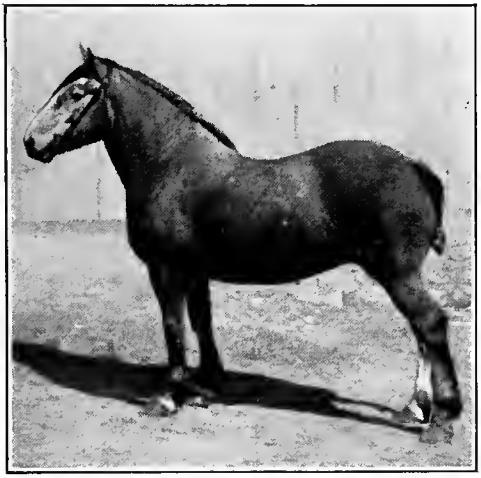

FIG. 148.—EXPORT CHUNK. WEIGHT, 1,550 POUNDS

Chunks.—This class takes its name from the conformation of the horse, rather than from the use to which he is put, although the prefix given the sub-class is indicative of the use. Chunks stand 15 to 16 hands high and weigh from 800 to 1,550 pounds. This class is composed of eastern, farm and southern chunks.

The eastern or export chunk was formerly known as the Boston chunk, but as the trade has widened to other cities and some are exported, they have become known by the general name of eastern or export chunk. As the

name signifies, they are very massive and compact, standing 15 to 16 hands high, rarely exceeding 15.3, and weighing from 1,300 to 1,550 pounds, depending on size and condition.

Farm chunks are not so massive or so heavy as eastern chunks. They are bought to be used on the farms and are found in greatest numbers on the markets at the season of the year when crops are being planted, particularly in the spring. Farm chunks are usually light in bone and often slightly blemished or unsound, as farmers do not usually care to pay high prices. They stand from 15 to 15.3 hands high and weigh from 1,200 to 1,400 pounds.

Southern chunks are not so heavy or so massive as either farm or eastern chunks. They are rather fine of bone, possessing an abundance of quality, and are more rangy in conformation, having more of the light horse blood in their veins. These chunks are used by the southern merchant as well as the southern planter. The southern farmer does not cultivate deeply and the soils are light, consequently he does not require a very large horse, although the trend of the market is for larger horses. The southern chunk stands from 15 to 15.2 hands high and weighs from 800 to 1,250 pounds.

Wagon horses.—Animals suitable for quick delivery are termed wagon horses. They must be closely coupled, compactly built, with plenty of constitution and stamina. They must be good actors, possessing a good clean set of limbs with plenty of bone and quality, and good feet that will stand the wear of the paved streets. Wagon horses stand 15 to 16.2 hands high and weigh from 1,100 to 1,500 pounds. This class is composed of express horses and delivery wagon horses.

Express horses are used by the express companies, and vary in size and weight according to the nature and weight of goods handled and the territory from which trade is drawn. Thus, if the business of a company is centrally located in a city and depots are not far apart,

they use larger horses and load heavier than if the business is done in the outlying parts of a city and the depots are considerable distances apart, in which case lighter horses with more action are demanded. The size of the horse, therefore, depends on the weight of the wagon to which he is hitched. A typical express horse is rather an upstanding, deep-bodied, closely coupled horse with good bone, an abundance of quality, energy

FIG. 149.—WAGON HORSES. WEIGHT, 3,400 POUNDS

and spirit. He stands from 15.2 to 16.2 hands high and weighs from 1,350 to 1,500 pounds.

Delivery wagon horses, or as they are usually termed, wagon horses, are similar to express horses, but the class is broader in its scope, including horses of common and inferior grades, as well as of good and choice grades. The demand for delivery wagon horses is large and comes from all kinds of retail and wholesale mercantile houses, such as meat shops, milk houses, grocery houses, dry-goods firms, hardware merchants, and the like. As a rule, delivery horses are not so large as express horses and not of as high a grade, as most mercantile firms are

not very liberal buyers and consequently get a cheaper grade of horses. There are exceptions to this, however, as some large department stores use their deliveries as an advertisement and buy very choice horses. The conformation of the delivery horse is practically the same as the express horse, except that they are not quite so large, standing 15 to 16 hands high and weighing 1,100 to 1,400 pounds.

Carriage horses.—As the name implies, this class of horses is used on the various heavyweight vehicles, and is often referred to as the "heavy harness" class. The

FIG. 150.—COACH HORSES OF STYLISH ACTION

animals of this class are plump, full, smoothly turned, high headed and stylish, with an unusual amount of quality. They must possess high, stylish action, with a fair amount of speed. Carriage horses vary much in height and weight, according to the sub-class to which they belong. They stand 14.1 to 16.1 hands high and weigh from 900 to 1,250 pounds. This class is composed of coach horses, cobs, park horses and cab horses.

The coach horse is the largest of the carriage horse class, standing 15.1 to 16.1 hands high and weighing from 1,100 to 1,250 pounds. Weight, however, is not so important as with draft and wagon horses, the principal

requirement being high, stylish action combined with beauty of form. The entire outline of the horse should be carried out in easy, graceful curves, pleasing to the eye. Cobs are the smallest of the carriage horse class, standing from 14.1 to 15.1 hands high and weighing from 900 to 1,150 pounds. This sub-class is of English origin. Cobs are small horses of a stocky build with plenty of quality, good length of neck, a neat head, and high action, carrying the knees high and bringing the hocks well under the body.

Park horses possess much of the coach horse type in that they possess symmetrical, well rounded bodies, an abundance of quality and flashy action. As the name indicates, they are strictly dress horses. They must be well trained, as they are often hitched tandem to a gig. Park horses stand from 15 to 15.2 hands high and weigh from 1,000 to 1,150 pounds. Cab horses are of much the same type as coach horses, except that they are of a lower grade, in fact many discarded coach horses are sold for cab use. The principal quality sought is symmetry of form combined with endurance. Cab horses stand from 15.2 to 16.1 hands high and weigh from 1,050 to 1,200 pounds.

Road horses.—This class embraces the lighter weights of harness horses which are commonly spoken of as drivers or "light harness" horses. They are lithe in build and more angular in form than those of the carriage class. The use to which they are put demands that they be able to cover distance in the quickest possible time without fatigue. Performance is the principal quality sought, but a good conformation is almost as desirable. Road horses stand 14.3 to 16 hands high and weigh from 900 to 1,150 pounds. This class consists of roadsters and runabout horses.

The roadster lacks the symmetry of form and the finish of the carriage horse. The body is more angular, the croup is more drooping and the width not so well carried

out, the thighs and quarters are not so deep or so well rounded out with muscle, and the rear flank is more tucked up, giving the general form of a greyhound. Action, stamina and endurance are the principal requirements. The roadster stands from 15 to 16 hands high and weighs from 900 to 1,150 pounds.

The runabout horse occupies an intermediate place between the roadster and the cob. He is not so lithe in build or so angular in conformation as the former, but is lither and more angular than the latter. He lacks the long, free open stride of the roadster, but is bolder, more frictionless and straighter than the cob. Because of the harness worn by the runabout horses, some authorities class them as carriage horses, but on account of their action, conformation and use, it seems more proper to class them as road horses. Runabout horses are rather short legged, standing from 14.3 to 15.2 hands high and weighing from 900 to 1,050 pounds.

Saddle horses.—The requirements for saddle horses are surefootedness, ease of carriage to the rider, good manners and ease of control. The action should be free, easy and frictionless, with no inclination to mix the gaits. It need not be extremely high, but the horse should keep his feet well under his body so that there will be little danger of stumbling or falling in case he should slip. The general form should be symmetrical and stylish. The neck should be moderately long, as this insures ease of handling and smoothness of carriage. In order to carry weight the back should be short, level and closely coupled, while the quarters should be straight and well muscled. The saddle horse stands 14.3 to 16.1 hands high and weighs 900 to 1,250 pounds. This class is composed of the five-gaited saddler, which stands 15 to 16 hands and weighs 900 to 1,200 pounds; the three-gaited saddler, which stands 14.3 to 16 hands high and weighs 900 to 1,200 pounds; the hunter, which stands 15.2 to 16.1 hands high, and weighs 1,000 to 1,250; the cavalry

horse, which stands 15 to 15.3 and weighs 950 to 1,100; and the polo pony, which stands 14 to 14.2 hands high, weighing 850 to 1,000 pounds.

Range horses.—During certain seasons of the year there may be found on the market horses bred and reared on the range. These are known as range horses, and are divided into two general classes, light and heavy, according to the predominance of light or draft horse blood. Most of these horses find their way to the country where they are trained, fitted and returned to the market to be resold.

Feeders.—Thin horses, purchased to be put into condition and resold, are called feeders. While they may belong to any of the market classes, by far the greater number are draft horses, chunks or wagon horses. The old adage, "A little fat covers a multitude of defects," is

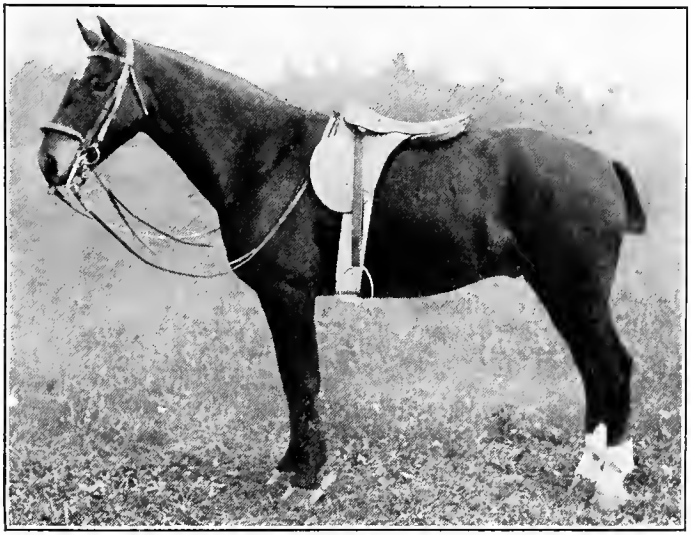

FIG. 151.—IRISH HUNTER

true, and the value of flesh when put on a thin horse is difficult to overestimate (p. 344).

MARKET CLASSES OF MULES

The mule market, though of more recent origin than the horse market, has grown to be a business of great magnitude and importance. In most respects the trading in mules is similar to that of horses; this is particularly true of the market requirements. As in horses, the market classes of mules are determined by the use to which they are put. In the East St. Louis market, which is the largest mule market in the world, there are five market classes: Draft mules, farm mules, cotton mules, sugar mules and mining mules. Mules are also graded according to height in hands.

Draft mules.—These animals do the same work as draft horses. They are preferred by grading contractors and for heavy teaming in cities located in warm climates, as they have great endurance and are able to stand the hot sun. Draft mules stand from 16 to 17.2 hands high and weigh from 1,200 to 1,600 pounds. As in draft horses, the principal quality sought is combined weight and strength. They should be large and rugged, with heavy bone and strong muscles, the back should be strong, the body deep and closely coupled, the croup not too drooping, the thighs and quarters heavily muscled and the feet should be large.

Farm mules.—Mules purchased for agricultural purposes are known on the market as farm mules. They are rather lacking in uniformity, standing 15.2 to 16 hands high and weighing from 1,000 to 1,300 pounds. They are likely to be plain looking and thin in flesh, though possessing good constitution, bone and feet and the qualities necessary for future development. Many of them are worked for a time, then fattened, and returned to market, when they sell in some of the higher priced classes.

Mining mules.—Mules purchased to operate mines are

called mining mules. They are used to haul cars of coal or ore to the hoisting shafts. These mules are massive, having deep bodies and short legs. They stand from 12 to 16 hands high and weigh from 600 to 1,350 pounds, the height being determined by the depth of the vein worked. Geldings are preferred to mare mules for this trade.

Cotton mules.—These are small, light-boned mules, used in the South on cotton plantations. They possess much quality and finish and are taller in proportion than mining mules. Cotton mules stand 13.2 to 15.2 hands high and weigh from 750 to 1,100 pounds. Mare mules sell better than geldings in this class.

Sugar mules.—These are mules purchased to be used on the sugar farms of the southern states. They are taller, larger and more breedy looking, with quality and finish, and have heavier bone than cotton mules. They stand 16 to 17 hands high and weigh from 1,150 to 1,300 pounds. Mare mules are the more popular.

Export mules.—During the past few years an export trade of considerable importance has developed. The size and type of mules exported are determined by the use to which they are put, and the country to which they are sent. Since some are used for army service, some for agriculture, some for heavy teaming, and others in the mines, it is apparent that they lack uniformity of type.

RULES OF AUCTION

In the auction ring, sales are made under certain well-understood rules which are published and are announced from the auction stand, and serve as a guarantee. The following are the more important rules:

Sound.—Perfectly sound in every way.

Serviceably sound.—Practically a sound animal, barring slight blemishes, which do not interfere with his usefulness in any way.

Wind and work.—The animal must have good wind and be a good worker, nothing more.

Work only.—He must be a good worker, nothing more.

Legs go.—The animal must be serviceably sound in all respects but his legs, on which no guarantee is placed.

At the halter.—Sold just as he stands without any recommendation.

Some market terms.—On the large horse market there are a number of terms used to designate undesirable characters, of which the following are the more important:

A bull.—Horse with unsound wind.

Bush.—To deduct a part of the stated sale price because the horse was not as represented.

Coon footed.—Long and low pasterns.

Green horse.—Not thoroughly trained.

Hipped.—One hip lower than the other.

Hog back.—A roach back.

Jack.—A bone spavin.

Light in the timber.—Light bones.

Lunker.—A big heavy boned horse.

Michigan pad.—A puff below the hock.

Nicked.—Operation severing cords on one side of the tail to straighten it.

Parrot mouth.—Upper jaw longer than lower one.

Rough behind.—Having a bone spavin.

Rounding hock.—Having a curb.

Smooth mouth.—An aged horse.

Speck in eye.—Spot on eye may impair sight.

Stump sucker.—A cribber.

Whistler.—Defective wind.

CHAPTER XXXII

PRINCIPLES OF HORSE FEEDING

To become skilled in horse feeding we should have a knowledge of the principles of feeding. The broader our understanding of the composition of the animal body, the composition of food, its use and digestibility, and the more familiar we are with the function of the various food materials, the more intelligently can we choose the foods that the body needs for maintenance and energy.

The animal body.—The body of the animal is composed of water and dry matter. Approximately one-half of the body weight consists of water, which the animal obtains largely from the water it drinks, though a portion may come from the food, particularly when the animal is given succulent food, as grass, carrots, and the like. The water of the body serves a number of purposes, chief of which are the conveying of the food from the digestive tract to those parts of the body where it is used, the removing of the waste of the body and equalizing body temperature.

Dry matter of the body.—To gain a clear conception of the relation of the food to the body, the dry matter may be divided in four groups of substances, as follows: Ash, nitrogenous materials, carbohydrates and fats. The ash is the mineral part of the body, and constitutes from 2 to 5% of the live weight. It occurs mostly in the bones. The nitrogenous materials are known by a variety of names, the most common being protein, which is characterized by the nitrogen it contains. These materials occur mostly in the lean meat, skin, hoofs and hair. The protein of the body is built up entirely from the protein of the food.

Very little carbohydrate material exists in the body, except in the blood. The liver acts as a kind of store-

house for this material and regulates the supply to the blood in such a manner that the muscles receive a uniform amount. It is also probable that the liver has the power to make carbohydrates from the fats and protein of the food. The quantity of fats in the body varies with the condition of the animal. They are found in all parts of the body and almost pure in the fatty tissues. It is probable that fats can be made from protein and carbohydrates as well as obtained from the fats of the food.

THE FOOD

Any material that an animal can take into the digestive organs and from which matter can be absorbed for the nourishment of the body may be considered as food. The value of food depends, among other things, on its composition and digestibility. There is a tendency to ignore this, and a ton of one food such as oats is often considered as valuable as a ton of another such as corn, whereas the materials actually available to the animal may be much larger in one case than in the other. Thus, in feeding horses the available nutrients of the food should be considered.

Composition of food.—As in the case of the animal body, the common foods are made up of water and dry matter, while the dry matter consists of ash, protein, carbohydrates and fats. Of these the protein, carbohydrates and fats are spoken of as the nutrients, since they furnish the body with the necessary matter and energy.

Water.—All foods, even the driest, contain some water. The amount varies widely in different foods, running as low as 8% in some of the concentrated foods to as high as 90% in some of the more succulent foods. Even dry hay varies in this respect, alfalfa containing only 6.5%, while some of the clovers run as high as 20%. Water is not a nutrient, therefore its presence is an important factor in determining the value of a food.

Ash.—Mineral matter is also present in all common foods, although it forms but a small part, corn containing only 1.5% per cent, while alfalfa, one of the highest, contains only 10%. Most foods, however, contain sufficient ash to meet the needs of the animal, corn and some prepared foods being the only exceptions. Young growing animals require more ash than mature ones.

Protein.—Of the three nutrients, the protein is considered to be the most important. This is because pro-

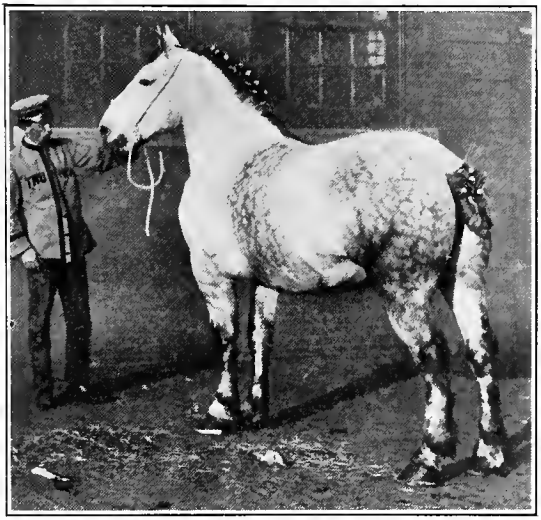

FIG. 152.—PERCHERON STALLION "HYSLOPE"

tein is essential to the animal, the only source of animal protein being the protein of the food, and because the percentage of protein in most foods is relatively small. Because of the importance of protein, the value of the food depends very largely upon the amount of this constituent that it contains. While the percentage of digestible protein in most foods is comparatively low, it

varies through wide limits, corn containing only 8%, while cottonseed meal runs as high as 37%.

Carbohydrates.—Most of the common foods contain relatively large amounts of carbohydrate material. There are two groups of carbohydrates—nitrogen-free extract and crude fiber. The nitrogen-free extract is composed largely of starches and sugars. It constitutes a relatively high percentage of the dry matter in some of our common plants, corn, wheat and potatoes running as high as 75% starch. Of the various nutrients, nitrogen-free extract is the most easily digested, while fiber, which constitutes the tough, woody part of plants, is mostly insoluble and, hence, largely indigestible. Fiber, therefore, is the least valuable of the nutrients. It is noteworthy that young plants contain less fiber than plants that have matured and formed seed. The percentage of digestible carbohydrates varies widely in different foods, running as low as 17% in flaxseed and as high as 70% in some of the cereal grains.

Fats.—While all food contains some fat, it is present in rather small quantities in all the natural foods. It occurs in largest quantities in the seed, and varies widely, running less than 2% in rye to 36% in flaxseed. Since the oil content of the food is determined by extracting the fat with ether, the tables of composition designate the fat as ether extract. A given weight of fat will develop from two to three times as much heat energy as an equal weight of carbohydrates.

USES OF THE FOOD

Animals need food to maintain their existence, which is dependent on matter and energy. While there are a number of uses to which the energy and matter of the food may be put, they can all be summed up in the following table:

USES OF THE MATTER AND THE ENERGY OF THE FOOD

1. To support life.....	a. To maintain body temperature b. To repair waste tissue c. To form new tissue d. To supply muscular activity of the vital processes
2. To reproduce life.	
3. To yield some product	a. Stored up as fat or flesh in the tissue b. Secreted in the form of milk or wool
4. To perform labor.	

Digestibility of food.—The value of a food depends, not alone upon its composition, but upon the digestibility of the various materials of which it is composed. To aid in an understanding of the digestibility of food, we will review briefly the process of digestion, in which the food materials pass on their way from the food as such to the flesh and energy of the animal body.

Digestion.—This is largely a process of solution, aided by chemical changes that take place through the action of ferments. The digestive organs form a canal through the body and the food in its passage through this canal is acted upon by these ferments. Each ferment has a special work to do in the process of digestion. The food is first taken into the mouth, where it is masticated and reduced to fine particles, in order that the digestive juices may better do their work. This also puts the food in condition to be swallowed. During this mastication there is a digestive fluid, called saliva, poured upon the food, which moistens it and changes a part of the starch.

This material now enters the stomach, where it comes in contact with a digestive fluid, called gastric juice, which changes a part of the protein. It next enters the small intestines, where it comes in contact with two digestive fluids—the bile from the liver and the pancreatic juice from the pancreas. The former prepares the material for the action of the latter, which has a complex function, acting upon the proteids, starches and fats. Digestive juices secreted by the walls of the intestines as the ma-

terial passes along still further complete the process, although a part of the food escapes digestion and passes out in the feces. During its course along the digestive tract, the digested material is absorbed and received into the vessels, through which it is distributed to the various parts of the body.

Digestible nutrients.—These are parts of the food materials that are digested and used by the animal. The amount of the food thus digested depends on the kind of food, the amount fed, the condition of the animal and like factors. Of the various food materials, the carbohydrates are the most digestible, while fiber is the least digestible, and between these lie fat and protein. As a rule, the fat is more digestible than the protein. In general the digestibility of a food decreases when exceedingly large amounts are fed. On the other hand, a greater digestibility cannot be secured by limiting the consumption below the normal amount demanded by the animal. In general, thrifty animals digest their food more thoroughly than those in poor health.

Since the digestible nutrients are the only food materials that the animal can appropriate to its use, it is with them that the feeder is concerned in choosing food for a ration. Much work has been done by the various experiment stations to determine the digestibility of foods. To show at a glance the amount of digestible nutrients contained in the various foods, Table VIII is published in the Appendix of this book (p. 448).

Conditions favoring digestion.—The changes that take place in the food materials during the process of digestion are very complex and proceed in accordance with fixed laws. While these changes are largely beyond the control of the feeder there are certain conditions that favor the completeness of digestion, chief of which are time of harvesting and method of curing hay as well as the grinding and wetting of certain kinds of foods.

The time to harvest hay, so as to get the maximum

amount of digestible material, is before the nutrients have been transferred from the stock to the seed. The seeds are so small and hard that they are not digested by the animal. Hence, hay that is cut when ripe is not so digestible as that cut before the seeds ripen, and while the food materials are yet in the growing parts. In addition, the riper the hay the more fiber it contains, and this further reduces the digestibility of the hay. Hay cured under adverse conditions, such as exposure to rain, when leaching occurs, loses in digestibility.

Grinding certain kinds of food promotes digestion by increasing the surface exposed to the action of the digestive juices. This applies especially to small hard grains, as when such grains are fed whole, many pass through the digestive tract entire. Further, grinding saves the animal the energy of crushing the grain. Wetting, steaming, cooking, and like processes, are used with the several foods preparatory to feeding, with the view of rendering them more acceptable to the animal. When increased efficiency occurs, it is due to more complete digestion rather than to added nutritive value.

KINDS OF RATIONS

A ration may be defined as the quantity of food that will be consumed by an animal weighing 1,000 pounds in 24 hours. In forming a ration there are a number of factors to be considered, chief of which are the amount of dry matter required, the digestibility of the ration, the nutritive ratio, the variety in the ration, the suitability of the foods, and the cost of the ration. Rations are commonly divided into two general classes according to the conditions; thus we have rations for maintenance and rations for production.

Maintenance rations.—The food required to meet the needs of a resting animal without loss or gain in body substance is called a maintenance ration. This includes

the amount of food required to support life, such as maintaining body temperature, repairing waste tissue, providing for the muscular activity of vital processes, and the like. The demands on the body for maintenance are for the production of muscular energy and heat; therefore, the maintenance ration may consist largely of carbohydrate material. This is an important observation in the wintering of idle horses.

Productive rations.—After the body needs have been supplied, the food that goes to the production of some useful product, as labor in the case of the horse, is called a productive ration. It is the food consumed in excess of the amount required for maintenance that enables the animal to produce a useful product. A productive ration, therefore, may be looked upon as consisting of two parts, the food of maintenance plus the food of production. In forming a productive ration, we should give the animal all of the food he will consume and make sufficient returns for in production. This requires careful consideration, as the amount of production is not always in proportion to the food consumed in excess of that required for maintenance. In this respect the individuality of the animal plays an important part; thus we have horses that are hard keepers or easy keepers, as the case may be. This variation among individual horses is so great that feeding standards can be used only as mere guides.

Feeding standards.—Many experiments have been conducted to determine the relation between the amount of muscular work performed and the food required per day. As a result of such work we have two classes of standards for the work horse, the Wolff-Lehmann, based upon the digestible nutrients, and the Kellner or Armsby, based upon the energy. Before we can use the former it is necessary to know the digestible nutrients in the food (p. 448), and before we can use the latter it is necessary to know the energy value of the food (p. 447).

WOLFF-LEHMANN STANDARD, SHOWING THE AMOUNT OF DIGESTIBLE NUTRIENTS REQUIRED PER 1,000 POUNDS LIVE WEIGHT FOR HORSES AT LIGHT, MEDIUM AND HEAVY WORK

Condition of animal	Dry matter	Digestible nutrients			Nutritive ratio
		Protein	Carbo-hydrates	Fat	
Light work....	20.0	1.5	9.5	0.4	1 : 7.0
Medium work..	24.0	2.0	11.0	0.6	1 : 6.2
Heavy work...	26.0	2.5	13.3	0.8	1 : 6.0

ARMSBY STANDARD, SHOWING THE AMOUNT OF DIGESTIBLE PROTEIN AND ENERGY REQUIRED PER 1,000 POUNDS LIVE WEIGHT FOR HORSES AT LIGHT, MEDIUM AND HEAVY WORK

Condition of animal	Digestible protein, pounds	Energy value, therms
Light work.....	1.0	9.80
Medium work.....	1.4	12.40
Heavy work.....	2.0	16.00

Balanced ration.—Foods vary widely in composition and they also vary considerably from the composition of the animal body. To meet the needs of the animal it becomes necessary to mix the foods in the proper proportion, so that the digestible nutrients will correspond to the demands of the body. This is called balancing a ration. Skill in balancing a ration depends much upon our knowledge of the digestible nutrients contained in the more common foods. It is rather a tedious undertaking, however, as there is no mathematical formula, and we must add to or take from the trial ration until the desired standard is obtained.

Nutritive ratio.—Since the only source of the protein of the body is the protein of the food, this nutrient plays an important part in the balancing of a ration. So im-

portant is this nutrient that rations are balanced according to the proportion of it they contain. Thus we have the nutritive-ratio, which is defined as the ratio between the digestible protein on the one hand, and the digestible carbohydrates and fats on the other hand. The nutritive-ratio is ascertained by multiplying the digestible fats by 2¼, adding the product to the digestible carbohydrates and dividing the sum by the digestible protein. Since the fat contains more energy than the other nutrients, it is multiplied by 2¼ to reduce it a carbohydrate equivalent.

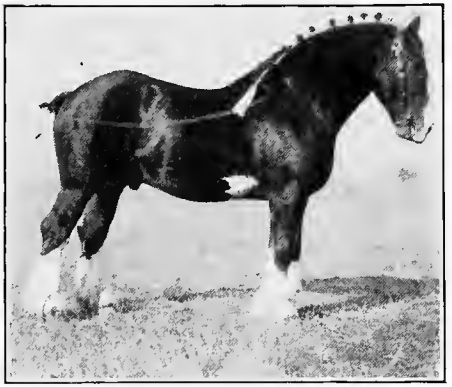

FIG. 153.—SHIRE STALLION "DAN PATCH"

The method of calculating the nutritive-ratio of corn, the digestible nutrients of which are, protein 7.8, carbohydrates 66.8 and fat 4.3, is as follows:

Fat 4.3	×	Heat equivalent 2¼	=	9.675
9.675	+	Carbohydrates 66.8	=	76.475
76.475	÷	Protein 7.8	=	9.8

Nutritive ratio 1 : 9.8.—This means that for each pound of digestible protein in corn, there are 9.8 pounds of digestible carbohydrate equivalent.

Computing rations.—To illustrate the method of calculating a ration for a given purpose we will assume the case of a horse weighing approximately 1,000 pounds and at light work. In order to compare the Wolff-Lehmann and Armsby standards we will take the same kind and amount of food in each computation. Let us choose from

Table VIII of the Appendix, 12 pounds of timothy hay, five pounds of corn and five pounds of oats. If we arrange these in a table and compute the digestible nutrients in each, according to the Wolff-Lehmann method, we get the following:

Food	Dry matter	Protein	Carbo-hydrates	Fats
12 pounds timothy hay..	10.41	0.33	5.08	0.15
5 pounds corn.....	4.47	0.39	3.34	0.21
5 pounds oats.....	4.48	0.44	2.46	0.21
	19.36	1.16	10.88	0.57

According to the Wolff-Lehmann standard (p. 331), this ration is deficient in protein and rich in carbohydrates, thereby giving a nutritive-ratio of 1 : 10.4, instead of 1 : 7.0, as called for in the standard. According to this standard, the ration could be improved by the addition of one pound of linseed meal.

Let us use the same food and calculate a ration by the Armsby standard (p. 331) for a 1,000-pound horse at light work. Taking the composition from Table VII of the Appendix and arranging the nutrients and energy in a table, we get the following:

Food	Dry matter	Digestible protein, pounds	Energy value, therms
12 pounds timothy hay	10.416	0.246	4.027
5 pounds corn.....	4.455	0.339	4.442
5 pounds oats.....	4.450	0.418	3.313
	19.321	1.003	11.782

According to the Armsby standard this ration, although composed of the same kind and amount of food as before, is slightly too rich in digestible protein and considerably so in energy value. This serves to emphasize the statement that feeding standards should serve as mere guides, to be modified according to attendant conditions.

CHAPTER XXXIII

PRACTICAL HORSE FEEDING

In seeking to improve our horses, we must not underestimate the importance of generous feeding. Breeding and selection make success possible, but will fail unless we provide a sufficient supply of the most suitable foods to the horse at all ages and stages of development. Horse feeding is essentially different from the feeding of other farm animals. Because of the small size of the digestive organs a relatively small quantity of roughage and a correspondingly large amount of grain is demanded. Further, the kind of work to which horses are put calls for the least possible load in the digestive organs.

Regularity of feeding.—The horse should be fed regularly and uniformly at all times. He anticipates the hour of feeding and becomes nervous if it is long delayed. He neighs and coaxes for his food with great regularity, and his system becomes accustomed to a certain order that must be followed. Sudden changes, even for a single meal, may produce more or less digestive disturbance. The working horse should be fed often, as undue fasting is followed by taking an excessive supply of food or by eating too rapidly, either of which are likely to result in digestive disorders.

Order of supplying grain, hay and water.—As the stomach of the horse is not large enough to hold the entire meal, the order of supplying grain, hay and water is of much importance. It is stated that the stomach of the horse must fill and empty itself two or three times for each meal. During the fore part of the meal the material is pushed into the small intestines almost as soon as it enters the stomach by the food which follows. while to-

ward the end of the meal passage is slow and the digestion in the stomach is more perfect. This would lead to the conclusion that the bulky foods should be fed first and the more nutritious foods toward the end of the meal. This practice leads to the serious objection that the horse is anxious, nervous and unsatisfied until fed his grain, for which reason he is usually fed grain before hay.

Watering the horse.—A discussion of the order of supplying food should include the time of watering the horse. Many persons think that the horse should be watered before feeding, while others are equally as certain that feeding should precede watering. This difference of opinion may be due to the fact that either method will sometimes result in digestive disorders. If the horse is watered before feeding he may drink to excess, which may cause digestive disorders and will surely affect the appetite, and he will not consume as much food as he otherwise would. On the other hand, if the horse is very thirsty and water is withheld until after feeding, he may not eat heartily and may drink so much water as to lessen his usefulness while at work.

The object to be attained is to water the horse so frequently that he will not become thirsty and, therefore, not drink to excess. To do this the work horse should be watered four times each day; perhaps better results would be obtained from watering six times. Little or no difficulty will be experienced if the horse is watered after breakfast, both before and after dinner, and before supper. Perhaps better results would be obtained if the horse was watered before breakfast and again after supper, thus making six times daily, as is the custom in many large stables.

Changing foods.—Sudden changes in the food are to be avoided, as the digestive system may not be able to accommodate itself at once to such, and digestive disorders follow. Such changes sometimes result in scouring, as when the horse is too suddenly transferred from

a dry to a watery diet. Sometimes a sudden change induces constipation, as a change from pasture to a dry ration. Such changes often overtax the digestive system to such an extent that it is permanently weakened, as when horses unaccustomed to grain are too quickly put on full feed. If the changes are made gradually, the system can digest without risk quantities of newly-ingested food that would have produced serious digestive disorders or derangements had they been given at first.

Preparation of food.—The food of farm horses and other horses at moderate work need receive little attention. Such animals have ample time to masticate and digest their food. On the other hand, work horses that are taxed to the limit of their endurance should have all grains ground and some of their hay cut or chopped. Foods thus prepared are more thoroughly and rapidly masticated and perhaps more thoroughly digested, especially the ground grain. Long hay should be supplied the animal, to be consumed at leisure. As hay is always more or less dusty, it should be fed in such a manner as to cause the horse the least annoyance. Moistening or sprinkling the hay with water is the simplest way of reducing this trouble. Of course, dusty hay should be avoided whenever possible.

Salting the horse.—Salt in limited quantities should be kept before the horse at all times. It is not best to place too much before him at a time, as some horses will eat it to excess, thus creating an abnormal thirst, and if given sufficient water may result in digestive disorders. Do not put the salt in the feed, as this practice often results in derangement of the digestive organs.

Food required to grow a horse.—The cost of raising a colt has been a much-discussed question, and the estimates vary widely. This variation in estimated cost is due largely to the conditions. In some cases, the cost has been estimated by considering the food at the market value, in other cases at the value on the farm, and in still

other cases at the actual cost on the farm, thus giving three cost prices. The better way to state the cost of raising a horse is to give the food required to grow him and then each person can estimate the cost according to the value he wishes to place on the food.

The sucking colt, fed grain as suggested (p. 291), will consume about 180 pounds up to weaning time. As a weanling he will consume five pounds of grain and seven pounds of hay per day; as a yearling seven pounds of grain and 18 pounds of hay; and as a two-year-old he will consume nine pounds of grain and 20 pounds of hay daily. These figures represent averages obtained from four years' work in growing colts. The heavy draft colts consumed somewhat large quantities, while the light ones ate considerably less. The grain consisted of 50 parts corn meal, 25 parts wheat bran and 25 parts ground oats, while the hay consisted of sweet, clean clover or alfalfa. The total food consumed up to three years of age is as follows:

FOOD CONSUMED BY GROWING COLTS

Age of colt	Period	Grain, pounds	Hay, pounds	Pasture
Sucker	June to October	180	....	5 months
Weanling	November to May	1,050	1,470	
Yearling	June to October	....	....	5 months
Yearling	November to May	1,470	3,780	
Two-year-old	June to October	....	....	5 months
Two-year-old	November to May	1,890	4,200	
Total		4,590	9,450	15 months

According to this computation, a three-year-old colt costs approximately 2¼ tons of grain, 4¾ tons of hay, and 15 months' pasture, on the average.

Factors in reducing cost of horse labor.—There are a number of factors operating to affect the cost of horse labor, chief of which are increasing the efficiency of the

horse and raising colts. Farm horses work a very small fraction of the time. On a number of Minnesota and New York farms, horses were found to work an average of about three hours a day. On such farms the cost of horse labor could be reduced by using horses more effectively. Another way to reduce the cost is to raise colts. From the nature of farm work, it would seem that the average farmer should raise more colts than are necessary to keep up the horses, so that there will be an income from the sale of surplus horse stock.

FIG. 154.—PERCHERON BROOD MARES AT WORK. WEIGHT, 3,200 POUNDS

Feeding the work horse.—The work horse should have rich food, as the richer the food the more easily it is digested, and the greater the proportion available for work. He should be fed liberally and frequently. The hard-working horse has a good appetite, a vigorous digestion and responds to intelligent care. Regularity in feeding, watering and working brings comfort and long years

of usefulness, while irregularity in these details is likely to result in digestive disorders and other derangements.

Amount to feed.—The feeding standards serve as a guide as to the amount of food that the work horse should receive. In general, this will be regulated by the size of the horse as well as by the amount and kind of work he is required to perform. In practice the work horse is supplied with approximately 2½ pounds of provender daily for each hundred pounds of weight. Of this amount from one-third to two-thirds, the exact amount depending on the severity of the labor, should be grain and the remainder sweet, clean hay. When the work is very heavy, the grain in the ration should be increased and the hay diminished, as grain contains more energy and is more easily digested. On the other hand, when the work is light, the grain should be diminished and the hay increased. The morning and midday meals should be light. They should not possess much bulk, as very bulky food lessens the animal's usefulness. The heavy feeding should come at night, when the horse has ample time to masticate and digest his food and is not obliged to go to work immediately after eating.

Method of feeding and watering.—The hard-working horse should be fed and watered so frequently that he will neither become hungry nor thirsty. Thus, he should be fed at least three times, watered not less than four times and if convenient six times daily. If accessible, therefore, the horse should be watered in the morning before feeding. For the morning meal feed one-fourth of the daily allowance at least one hour before going to work. This should be in condition to be easily and rapidly consumed, so as to be well digested when the animal goes to work. He should be watered as he goes to work, and after five hours of exhaustive labor he should be given his midday meal. Before being fed, however, he should have a drink of fresh, cool water, taking care that he does not drink too rapidly or gorge himself if very warm.

Feed another quarter of the daily allowance, and if convenient remove the harness so he can eat in quiet and comfort, and thus gain a few minutes of much-needed rest. Allow one hour to consume the midday meal. After being watered, he is ready for the second half of his day's labor. When worked five hours he should be given the evening meal. As he comes to the stable in the evening, he should, first of all, be given a drink, exercising care as before to see that he does not drink too rapidly. The horse is now ready for the remainder of his day's allowance. Unharness at once and when the sweat has dried give him a thorough brushing. Blanket him for the night. If convenient, he should be given a drink in two hours after feeding, when he may be bedded down and left for the night.

If, for some reason, the horse is forced to stand idle in the stable for a few days, the grain ration should be reduced. Otherwise, he will become stocky and his legs become swollen and stiff. Many horsemen give a bran mash Saturday evening and reduce the grain on Sunday.

Individuality in feeding.—While we can estimate closely the amount of food to be given a large number of horses, yet the individual ration should be modified to meet the needs of each animal. Possibly one horse should have a little more than the regular allowance, and the next a little less, because some horses are more difficult to keep in condition than others doing the same work and under similar conditions. The object sought is to keep each in the desired condition.

Cost of the ration.—In formulating a ration for the work horse, due consideration should be given the cost, which will vary with the size of the animal, the nature of the work performed and the cost of the food. Hays are ordinarily much cheaper than grains, especially on farms, but a hard-working horse is unable economically to dispose of a large proportion of bulky food. It requires time and energy to masticate and digest rough food, which

lessens the usefulness of the horse. Within proper limits the more concentrated the food, the less time and energy will be required to make it available. While the relative proportion between the grain and roughage in the ration will depend upon the amount and kind of work performed, yet a hard-working horse should never be expected to consume more roughage than grain by weight.

In the choice of grains the cost is given little or no consideration by the average person. Thus, we often continue to feed oats when it is the most expensive grain upon the market, whereas equally as good results would be obtained by feeding some other grain, in part at least, and the cost would be lessened thereby (p. 348).

Feeding the driving horse.—The periods of comparative idleness, followed by long drives and hours of overexertion, make the feeding of the driving and carriage horse a difficult task. The irregular work, necessitating irregular feeding, often weakens the constitution of the driving horse, which generally has but a brief career. As far as possible, the same general plan as that suggested for the work horse should be followed. When the horse is not driven the grain part of the ration should be reduced and the normal allowance should not again be given until the work is resumed. Driving horses are often overfed because of the desire of the owner to keep them in the pink of condition. This overfeeding and irregular exercise is the cause of most of the ills of the driving horse.

Oats and bran easily lead among the concentrates and timothy hay among the forages. A bran mash should be given once a week if bran is not more regularly fed. Care must be exercised in feeding laxative foods, such as green grass, clover or alfalfa hay, and too much bran, as such foods prove very draining on the system of the horse as well as disagreeable to the driver.

Wintering the idle horse.—Since practically all of the farm work comes during the growing season, many

horses are idle during the remainder of the year. As they do not do sufficient work to pay for their keep, they should be fed as economically as possible. It is more economical, and, perhaps, advisable, that idle horses be turned to a lot to be roughed through the winter rather than confined too closely in the barn, particularly if they have access to a dry, well-protected shed. Under such conditions they grow long, heavy coats, which afford them excellent protection. Idle horses have ample time

FIG. 155.—PERCHERON STALLION AND MARE WORKING SIDE BY SIDE

to masticate and digest their food and can subsist largely on forage, such as hay, corn fodder, straw, and the like. Some grain should be fed once a day. If the shed is kept well bedded and dry, idle horses can be comfortably wintered in this way at much less expense than by stabling. Grain feeding, together with some work, should begin three weeks before spring work starts to put the animals into condition.

Feeding the stallion.—The object to be attained in the management of a stallion is to so feed, groom and exer-

cise him as to keep the horse up to the very highest pitch of strength and vigor. Many persons, among them some who should know better, endeavor to have the stallion in fine show condition at the time the breeding season opens. The horse is heavily fed, closely blanketed, and denied sufficient exercise, he becomes loaded with fat, his muscles become soft and flabby, and although he may seem in the pink of condition, he is not nearly so well fitted for service in the stud as he would have been had he received plain food and an abundance of exercise each day. To insure exercise the stallion should be worked moderately when convenient.

During the breeding season the grain ration should consist mainly of good sound oats, as nothing is better; but this should be varied from time to time by adding corn, barley, wheat, and the like. Wheat bran is a valuable adjunct to the ration, and should never be dispensed with. It is not only rich in protein, an especially important element of nutrition for the stallion, but is the cheapest, safest and best of all regulators of the bowels. The roughage should consist of sweet, clean hay, timothy or timothy and clover mixed. A few carrots occasionally is a very valuable addition to the ration of breeding animals.

Feeding mules.—Mules should be fed similar to horses. There is a prevailing notion that mules eat less than horses under similar conditions. Such is not the case, although they are less likely to overfeed and gorge themselves than horses, and will make use of coarse foods that horses will not eat unless forced to do so by neglect. Mules are sometimes preferred by large business firms, not that they consume less food for a given amount of work than do horses, but that their management, both feeding and working, can be trusted to less skilled hands and with better results than can be obtained with horses. In all important essentials, mules are very similar to

horses and should be fed, watered and worked accordingly.

Fattening horses and mules for market.—In certain parts of the country feeding horses and mules for the market has become as much a regular business as feeding cattle and swine. While excessive fatness may lessen the future usefulness of both horses and mules, yet the market demands such and it is the business of the producer to supply the demand. Providing the animals are sound, it is not possible to get them so fat that buyers will object for that reason.

The methods practiced in various parts of the country differ widely, as do the foods used. The animals are purchased, their teeth are floated, and they are put in the barn and fed gradually, as care must be taken for a few days to avoid colic. On account of the small size of the stomach it seems most profitable to feed grain five times a day, while hay is placed in the racks so they may have access to it at all times. One large firm gives three feeds daily of mixed feed, bran, shorts and oats; and two feeds of corn with clover hay available at all times. The animals are kept closely blanketed and stabled, with no exercise whatever. To keep the blood in good order, thus preventing in part stocklegs, glauber salts are sometimes used. These salts are used once a week. The assertion is made that the salt aids in putting on flesh, and that it gives the skin a soft, mellow touch. In some instances, horses fed in this manner have made gains of as much as five pounds per day for a period of 50 to 75 days. The average feeding period, however, is from 75 to 100 days and an average gain of three pounds per day is considered satisfactory.

Sample rations for the horse.—The following rations are collected from various sources and furnish a guide in determining the kind and amount of food that should be fed under various conditions;

Horse and work	Weight of horse	Ration	
		Grain	Roughage
Farm team, east	1,400	9 lb. oats 9 lb. corn	18 lb. mixed hay
Farm team, east	1,220	8 lb. oats 6 lb. corn 2 lb. bran	10 lb. hay
Farm team, east	1,230	8 lb. corn 7 lb. bran	10 lb. hay
Farm team, west	1,230	12 lb. oats	15 lb. alfalfa hay
Farm team, west	1,870	5 lb. bran 5 lb. shorts	25 lb. alfalfa hay
Farm team, west	1,385	.....	20 lb. alfalfa hay
Light draft, east	1,350	4 lb. oats	15 lb. hay
Light draft, west	1,350	10 lb. oats 2.5 lb. bran	7 lb. hay
Medium draft, east	1,350	12 lb. oats	12 lb. hay
Medium draft, west	1,350	8 lb. oats	16 lb. hay
Heavy draft, east	1,600	9 lb. oats 9 lb. corn	24 lb. timothy hay
Heavy draft, east	1,600	23 lb. oats	12 lb. hay
Moderate driving	1,000	8 lb. oats	10 lb. timothy hay
Moderate driving	1,000	4 lb. oats 4 lb. corn	10 lb. timothy hay
Heavy driving	1,000 1,000	14 lb. oats 7 lb. oats 7 lb. corn	10 lb. timothy hay 10 lb. timothy hay

Grain Mixture for Colts

40 parts ground oats
40 parts wheat bran
20 parts corn meal

Winter Ration

Age of colts	Grain	Hay
Weanlings	5 lb.	7 lb. clover hay
Yearlings	7 lb.	18 lb. clover hay
Two-year-old	9 lb.	20 lb. clover hay

CHAPTER XXXIV

GRAIN AND CONCENTRATES FOR THE HORSE

The ration of the horse usually lacks variety. If we study the ration for horses in a locality we find it composed of one or at most two kinds of grain and one kind of forage. The owner insists that this is the most practical and economical ration he can feed with safety to his horses. We need not travel far, however, to find the list of foods more or less changed, sometimes entirely so, yet with the same claim of superiority or necessity as before. Thus in one section the most common feeds for the horses are oats for grain and timothy hay for roughage; in another section corn serves as grain and clover hay as roughage; in another, crushed barley is the common grain, while the hay comes largely from the wild-oat and barley plants; and in still another section corn serves mainly as the grain, with corn fodder for the roughage. In fact, the range of foodstuffs that may be fed the horse with safety and success is rather large.

THE CEREAL GRAINS

Most of the grain fed to the horse comes from the cereal plants—oats, corn, barley, rye and wheat. The cereal grains are very similar in composition. They contain a fairly low water and protein content and a considerable amount of nitrogen-fee extract, fiber and fat. They are palatable and digestible. The question of a choice of cereal grain for feeding the horse will be largely determined by the relative cost.

Oats.—There is no other grain so safe for horse feeding as oats, the animal rarely being harmed if by accident or otherwise the feeder gives an oversupply. This

safety is due to the oat hull, which causes a given weight of grain to possess considerable volume. This lessens the liability of mistake in measuring the ration. Further, the digestive tract cannot hold a quantity of oat grains sufficient to produce serious disorders.

It is said that horses fed on oats show a spirit which cannot be attained by the use of any other feeding stuff. It has been urged by many that this is due to a peculiar stimulating substance called "avenin," which the oats is said to possess. Oats may have a flavor that makes

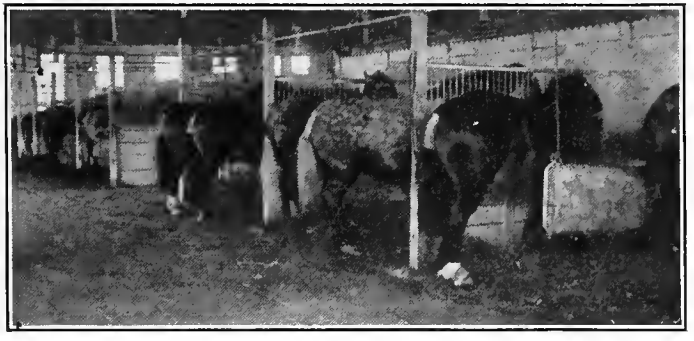

FIG. 156.—FATTENING HORSES FOR THE MARKET

it a favorite food for horses, but the most careful chemical study has failed to reveal any substance of the nature of "avenin." Again, it is stated that the fats of oats are more thoroughly digested than those of other cereals.

The weight of oats determines the quality of the grain. If the oats is light it indicates that there is a large proportion of hull to grain and the oats is worth less than if it were heavy, which indicates a large proportion of grain and a small amount of hull. Unless the horse is pressed for time or has poor teeth, the oats should be fed whole. It is generally agreed that new oats should not be fed to horses. Musty oats should always be avoided.

Corn.—Next to oats, if, indeed, it does not exceed it,

corn is the common grain for the horse in America. It is used largely in the corn belt and to the southward in the cotton states. Much has been said against the use of corn. However, it is ordinarily the cheapest of all the cereal grains. A given weight furnishes more energy than any other food. It furnishes the largest amount of digestible nutrients, at the least cost, and is universally palatable. While conceding that corn is not equal to oats as a grain for the horse, nevertheless, because of its low cost and high feeding value, this grain will be extensively used when large numbers of horses must be economically maintained. Corn contains large quantities of nitrogen-free extract, and when fed exclusively is too fattening. If fed in too large quantities it produces digestive disorders. Corn also lacks a sufficient amount of mineral matter and protein for the prop development of young animals.

Oats and corn—Ground corn and oats, mixed half a half, make a very good grain ration for the horse, and much cheaper than oats alone. In a three years' te with gelding and brood mares worked on farms and a heavy draft, this mixture gave equally as good result as whole oats, and reduced the cost of the ration ap proximately 10%. The bulk of the oats overcomes, i a large measure, the objectionable features of the corn while the corn, with its large amount of easily digestible materials, supplies the ration with much energy.

Barley, rye and wheat.—Each of these grains is sometimes fed to the horse. The question of their use depends largely upon their market price. Usually they are worth more for other purposes. Wheat especially is worth more for milling. Wheat has, however, been fed to the horse with varying success, depending largely on the feeder and the method of feeding it.

Barley is not fed to horses in the East to any great extent because of its demand for malting, but on the Pacific coast it is extensively used for feeding horses at

all kinds of work. When the horse's teeth are good and the labor not severe, barley may be fed whole. Ground barley when mixed with saliva forms a pasty mass in the mouth, and is therefore unpleasant to the horse while eating. Crushing the grain makes it less objectionable.

Rye is often fed to horses. It is the least palatable of all the grains and many horses will hardly eat it unless ground and mixed with other foods. In many localities, rye is likely to be infected with ergot, which has a bad effect upon the horse and may be the cause of abortion in brood mares.

Leguminous grains.—Besides the cereal grains there are a few leguminous seeds that are used as horse feed. These leguminous seeds differ from cereals in their composition, in that they contain a relatively large percentage of protein, and are perhaps not so digestible as some of the cereal grains.

Horse beans, field peas and cowpeas.—These are perhaps the most used legumes as a food for the horse. Horse beans and field peas are extensively fed in Europe and Can-

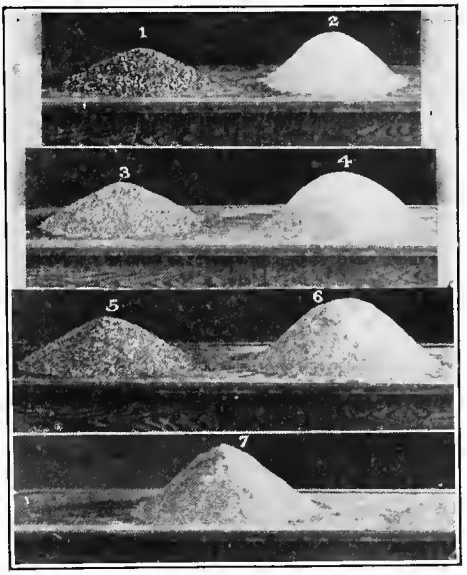

FIG. 157.—BULK IN GRAIN RATION

1. Shelled corn. 2. Corn meal. 3. Whole oats. 4. Ground oats. 5. One-half shelled corn and one-half whole oats. 6. One-half corn meal and one-half ground oats. 7. One-third wheat bran, one-third corn meal and one-third ground oats.

Each lot contains the same amount of digestible nutrients. Note the larger bulk in lots 5, 6 and 7.

ada, while cowpeas are used in the southern states. The horse usually takes to these grains after a time, and they have a good effect upon the animal unless fed in too large quantities, when they prove harmful. Five pounds per head per day may be considered the maximum that can be fed with safety.

BY-PRODUCTS AND COMMERCIAL FEEDS

Aside from the whole grain there are on the market numerous feeds containing only parts of the various grains and are called by-products, commercial feeds, and the like. These constitute the part of the grain left after the manufacture of some product. Thus, when starch is manufactured from corn, the nitrogenous part of the grain is rejected and constitutes gluten feed or meal. Cottonseed cake or cottonseed meal is the material left after the oil has been expressed from the cotton seed. In the same way, linseed meal is the residue obtained in the manufacture of linseed oil. Dried brewer's grain is the dried barley grain after it has been brewed. Bran, middlings and shorts are left after the manufacture of flour.

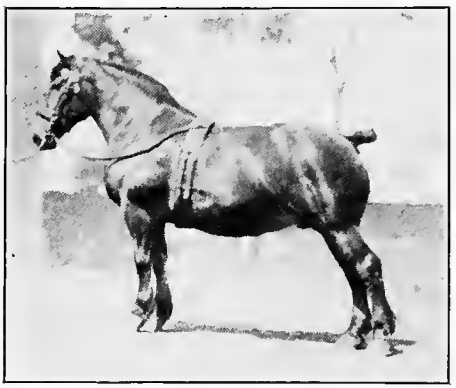

FIG. 158.—BELGIAN STALLION "LUDIA"

Wheat bran.—Because of its physical effect, bran is considered a very valuable addition to the ration of the horse. It has a loosening effect on the bowels and a tendency to allay feverish condition. It is entirely too

bulky to constitute any considerable part of the ration of a hard-working animal. It is a very good food for young and growing animals, as it is rich in mineral matter and protein, elements that the young animal must have to build up his body. It serves the needs of the grown horse best when given as a "condition" food.

Linseed meal.—This food is very rich in protein, and is often fed to the horse in limited quantities, more for the specific effect it has on the horse than for the actual nutrients it contains. It stimulates the skin secretions and gives the horse a very smooth and glossy hair. It can be used as a laxative. Linseed meal is very palatable and easily digestible. It is fattening in its nature and hence desirable if one wishes to fatten his horse. Linseed is valuable as a food for the growing colt because of its high amount of mineral matter and protein. It cannot be fed, however, in very large quantities because of its laxative effect, and some horses cannot eat it at all, as it scours them at once.

Cottonseed meal.—This meal has about the same composition and the same effect on the mature horse as has linseed meal. Cottonseed meal should not, however, be fed to young and growing animals.

Gluten meal or feed.—Gluten is sometimes fed to the horse. It is rich in protein, but rather deficient in mineral matter. It has the objection that when moistened with saliva it has a tendency to form balls in the mouth and is not so palatable. However, it is quite digestible. Like linseed and cottonseed meal, it should not be fed in very large quantities. Because of its low mineral matter content it should not be given to the young and growing colt.

Dried brewer's grains.—These grains have been used in the ration of the work horse with success. An experiment is quoted when they were compared with oats and the following conclusions drawn: In both rations the nutrients furnished were sufficient to maintain the weight

of the animal under average work; taking all in all, a pound of the dried brewer's grains was quite as useful as a pound of oats in the ration for work horses.

Molasses.—Numerous trials have been made of feeding molasses to horses, particularly in the South. It is rich in nitrogen-free extract and hence is quite digestible. In the South, where it is fed extensively, it is fed from a large trough, and the animals are allowed to eat at will. In the North it is customary to dilute it with water and sprinkle on the hay. Molasses has a good physical effect upon the animal. It encourages skin secretions and keeps the hair fine and glossy. There are some disadvantages connected with the use of molasses, however, as it attracts insects, especially flies and ants, sticks to the animal's coat, halter, tie strap and manger, and is difficult to mix with other foods.

Patent stock foods.—If the horse is out of condition, or if the food is not so good as it should be, the use of condimental or patent stock foods may be of advantage in bringing the animal up to the normal condition. The price at which these patent foods are sold makes them extremely expensive to the consumer, and the profits that accrue from their sale are great. Yet if one has a horse that is out of condition it may be profitable to buy a package of this food. There is nothing difficult in the making of these foods, and any one can mix a "conditioner" himself if he has the time and disposition to do so.

CHAPTER XXXV

HAY AND FORAGE FOR THE HORSE

The kinds of forage that are available for horse feeding are even more numerous than the grains, and they vary as widely in their composition and nutritive value. Dry forage, on the average, contains from one-third to one-half the energy value of grain. It differs from grain in that it contains more water and more fiber. Because of the high percentage of water, succulent forage contains from one-third to one-half the energy value of dry forage. Many of the succulent foods, especially roots and tubers, are almost entirely digestible.

HAY AND DRY FORAGE

It is better to have the digestive tract of the horse moderately distended with coarse material rather than contracted, as would be the case if grains possessing only the requisite nutrients were supplied. In fact, horses fail to thrive when fed concentrates alone; even oats with their strawlike hulls do not provide sufficient bulk. Further, on farms roughage is ordinarily much cheaper than concentrates and, therefore, should be used as much as possible, although some grain should always be fed in addition, especially to working animals.

Timothy hay.—Although not particularly rich in digestible nutrients, timothy is the standard hay for horse feeding. There are many reasons for its popularity. It can be grown successfully in nearly all localities and is the principal market hay; it is difficult to adulterate with other grasses or weeds without detection; it is relished by horses; it is free from dust—all of which conditions commend good timothy hay as a horse food.

Clover hay.—This hay has not been held in high esteem as a forage for horses. The reasons are obvious. It is generally loaded with dust, and this is often hard to prevent. The clover stem is not stiff enough to hold the plant upright and it falls to the ground, and more or less dirt is splashed upon it by rain. Then the leaves and stems are very brittle and crumble into dust in the curing of the hay. Further, the hay often goes into the mow so moist that fermentation takes place. During this oxidation or slow-burning process, particles of blackened, partially carbonized leaves are produced,

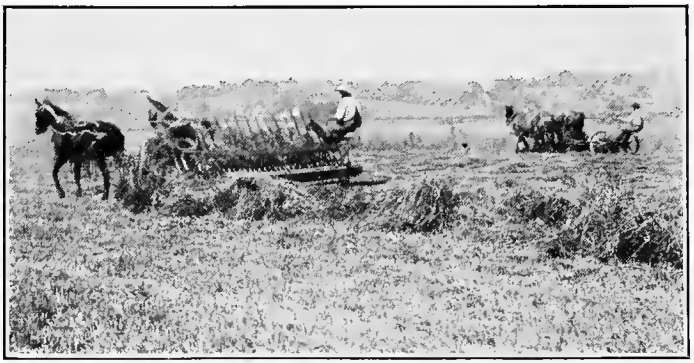

FIG. 159.—MODERN METHOD OF MAKING HAY

which finely divided matter rises in the air in clouds of dust when the hay is moved. Some of it enters the nostrils of the horse and is drawn into the lungs, there setting up serious irritation. This can be prevented in large measure by moistening the hay before feeding. When bright and clean, clover is a very valuable food for the horse, especially for the young and growing colt, as it is rich in protein and mineral matter; in fact, it makes a better ration than timothy when fed in limited quantities.

Alfalfa hay.—This hay belongs to the same natural

family as clover hay, and meets with similar objections. It is likely to be dusty, especially when grown in regions of considerable rainfall. It seems certain that alfalfa fed in limited quantities will prove as efficient as timothy to the slow-going draft horse. Horses are very fond of alfalfa, and it is necessary to guard against feeding an oversupply. Like clover, there is no better forage for the young and growing colt.

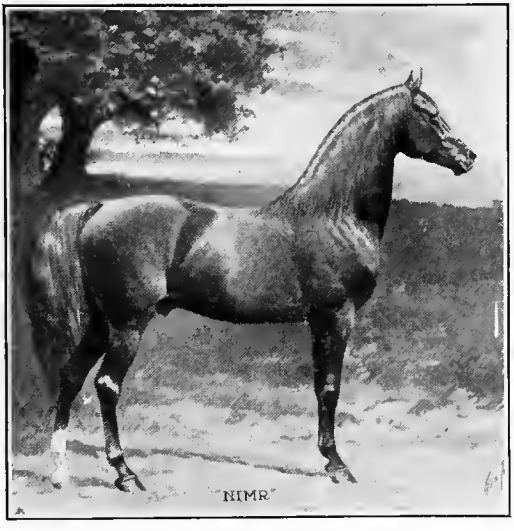

FIG. 160.—ARABIAN STALLION "NIMR"

Cereal hay.—Cereal plants, such as oats, barley and wheat, are often harvested before the grain matures and the forage used as hay. Such hay is extensively used on the Pacific Coast, especially in California, where it is held in high esteem as a forage for race horses. Cereal hay may often be advantageously employed for horse feeding in the eastern United States. When timothy commands a very high price, many successful farmers sell their timothy and raise oat hay for their work horses.

Millet hay.—Hay from Japanese millet, Hungarian grass, and like forages, may often be advantageously fed to horses, provided the allowance is limited (p. 358). When such hay is properly cured, and fed in moderation, or in connection with some other hay, it makes a very good forage for the horse and produces no unfavorable effects. Perhaps some grain should always be fed when millet forms a part of the ration.

Corn forage.—Thickly grown corn, when properly cured, makes one of the best dry forages for the horse. Corn thus seeded bears small palatable ears which are easily masticated. The leaves are free from dust, as well as palatable and full of nutrients. When the yield of such forage and its feeding value are compared with that of timothy hay from the same area, the usefulness and economy of the corn plant becomes apparent.

Corn stalks.—Dry corn stalks that have been cured in the shock are sometimes fed as a substitute for hay. Experiments and experience have shown that in the fall before the leaves are leached it is as valuable as timothy hay, pound for pound consumed. The stalks cost only one-third as much as the timothy and therefore they prove much more economical. The question is often raised whether cutting or shredding improves their digestibility. It will not improve the digestibility, but cutting or shredding has other advantages: The cut or shredded stalks can be much more conveniently stored; they are more easily handled; they will retain their nutrients longer than if left to leach in the shock. If the stalks are to be fed in this manner, emphasis must be put upon the necessity of cutting the corn as the ear hardens and before the blades and stalks become dead or are bitten by frost.

Straw.—The straw of the various cereal grains is sometimes fed to the horse as a part of his roughage. While the straw has some value, the horse requires much more grain when hay is replaced by straw. Idle work horses

in winter can utilize some straw, but they should not be compelled to subsist wholly on it, as it contains much fibrous material and is largely indigestible. It should never be fed to hard-working animals. In relative value for horse feeding the straws rank in the following order: Oats, barley, wheat and rye, the latter being of little use as a horse food.

SUCCULENT FOODS

In addition to the dry hays, the horse can make good use of many of the succulent foods and will be much benefited thereby. These succulent foods are all characterized by their very high water content and by their low energy values, the latter about one-half that of dry hay.

Green forage.—Sometimes it happens that the feeder runs short of hay before the new crop comes on, and he either cuts the grass and feeds it green, which we call soiling, or turns the horses out to pasture. When the grass is cut and fed green, it is well to bear in mind that it contains very much water and very much more of it by weight must be fed. The leguminous forages, such as alfalfa and clover, are richer in protein, and may cause a larger excretion of urine. Either of these methods is practicable when the animals are at moderate work, but neither should be employed when the work is severe, as it takes the animal too long to get sufficient nutrition.

Silage.—This succulent food has been fed to the horse from time to time with varying success. If the silage is good and is fed in moderate quantities, it may be given to idle horses, to idle brood mares and to growing colts with safety. It should not be fed to the hard-working animal, as he must consume too much to get sufficient nutrients to avail him much energy, because of the high percentage of water.

Roots and tubers.—Carrots, rutabagas, potatoes and

other roots and tubers are occasionally fed to the horse. These foods contain a high percentage of water and small amounts of nutrients. The use of such materials for horses has been attempted at different times with varying success, but they are not used to any great extent in this country, although very common in Europe. Carrots are often fed as "conditioners." For this purpose their value is high, but for actual nutrition very low.

Fruits.—Apples, dates and prunes have been fed in the regions where they thrive, when the price was sufficiently low. Such foods are of little or no use, with the possible exception of apples.

Injurious feeding stuffs.—In feeding the horse precautions should always be taken to avoid materials harmful in themselves, or those which may become harmful. Dirt, sticks, small stones, and the like, should be removed from the grain before feeding. All feeding stuffs should be cleaned.

Millet.—This hay, when fed in large quantities, is considered injurious to the horse. It is reported that it produces increased action of the kidneys, causes lameness and swelling of the joints, destroys texture of the bone, and the ligaments and muscles are torn from their places when the animal attempts to move.

Ergot.—Plants which are ordinarily wholesome may become harmful if infested with ergot. Some investigators say that it causes rheumatism in the horse and that it may cause pregnant mares to abort.

Feeds that are ordinarily wholesome may, under certain conditions, be harmful. There is a widespread prejudice against moldy or decomposed feeding stuffs. It has been shown that the continued feeding of moldy corn induces intestinal and nervous disorders of a serious nature.

Foods that influence digestion.—Some foods, in addition to the nutrients they furnish, exercise an influence on the digestion so favorable as to place their value

far above what is represented by the nutrients which they contain. The influence thus exerted tends to correct the harmful results that grow out of constipation or undue laxity of the bowels. Because of this, when used mainly to give proper tone to the digestion, the real value of such foods is usually far above their market value. When fed for such use, small and moderate, rather than large quantities should be supplied. This list of foods includes all kinds of field roots, as carrots, turnips, rutabagas, parsnips, and the like; such by-products as bran, oil meal of various kinds, and condiments; such hays as alfalfa and clover, and green grass.

CHAPTER XXXVI

CARE AND MANAGEMENT OF THE HORSE

The efficiency of the work horse depends largely upon his general care and management. This fact is often overlooked and in an attempt to make up for the deficiency the horse is given too much food, which usually shortens his career. The successful horseman must be a man of industrious habits. His work is, in a sense, never done owing to the ever-present necessity of furnishing the horse substance and protection. In some lines of work the neglect of one day may largely be made up the next, but in caring for the horse this is not possible. Injury resulting from neglect is always attended with loss and cannot be atoned for even by extra care subsequently. The caretaker must be devoted to his work. If he does not take to it kindly he does it in a perfunctory manner. Food is given by rule, regardless of the individual needs of the animal. Such a person is likely to be impatient, and perhaps positively cruel. On the other hand, the person who loves his work has a more careful regard for the individual needs of the animals intrusted to his care. If anyone is to wait for a meal beyond the usual time it will be himself rather than his horse.

Gentleness in handling the horse.—The horse is a very sensitive animal. We should handle him quietly and gently at all times. Striking or shouting commands at a horse is an inconsiderate practice. It not only causes the animal to lose confidence in his master, which renders him less teachable, but it destroys nervous energy, thereby making the horse a less economical producer than if he was protected at all times from such nervous shocks. Possibly it is a reflection upon our humanity, but the statement is made that here in America more

horses are made short-lived by ill-treatment and excessive work than by poor feeding.

Grooming the horse.—The work horse should be thoroughly groomed each evening after the day's work is done as well as in the morning before the work begins. In some respects this is almost as essential as feeding and watering. The cleaning and rubbing of the skin stimulates the secretions and improves the tone of the entire system. More important than this, however, is the good effect upon the feet and legs. Cleaning and rubbing the feet and legs are very important factors in preserving soundness.

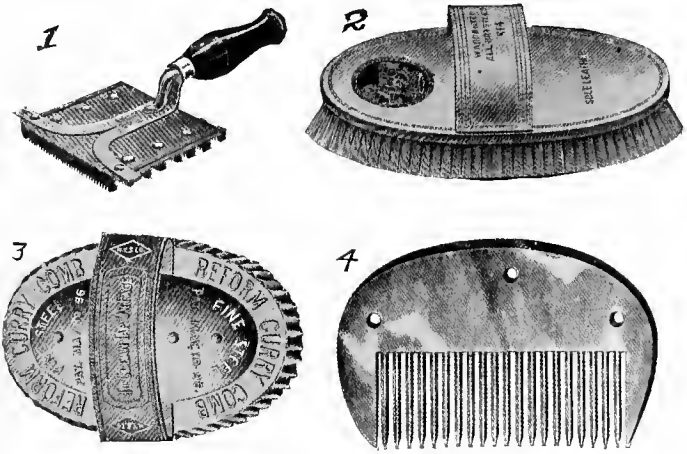

FIG. 161.—GROOMING TOOLS

1. Common currycomb. 2. Body brush. 3. Reform currycomb. 4. Mane and tail comb.

In grooming the horse, the principal tools needed are a currycomb, body brush, flannel cloth, mane and tail comb, a hoof hook and a half-worn broom for use on the legs. The currycomb is used to loosen the hair which has become matted with sweat and dirt, and to remove splashes of mud, thus preparing the way for the body

brush, which it also serves to keep clean. In currying and brushing the horse with a sensitive skin, great care should be exercised, as carelessness often provokes kicking, striking, biting, and the like. After currying and brushing, rub the hair free from dandruff with the cloth. Straighten out the snarls and tangles in the mane and the tail with the comb. The hoof hook, which is somewhat similar to a hay hook, is used to clean foreign materials from the sole of the foot. The half-worn broom is a very convenient tool for removing loose mud from the horse's legs when he first arrives at the stable.

When the horses are worked in the mud, their legs should be clipped as far up as the knees and hocks, for by so doing the limbs may be kept clean with much less difficulty. Much difficulty is often experienced in keeping the legs of horses that possess "feather" free from disease, especially when the footing is muddy and the weather cold. In case the legs are clipped, it is all the more important that they should be thoroughly cleaned and rubbed each evening after work.

Clipping the horse.—There is much discussion as to the wisdom of clipping horses. Those persons that favor clipping state that it improves the general appearance, renders the coat more easily kept clean, and that a clipped horse is less liable to take cold than a long-coated one, because the evaporation is more rapid and the animal does not get so warm. On the other hand, those that oppose clipping state that it is not possible to make a clipped coat show the luster of an unclipped one; by the proper use of blankets it is possible to keep the coat rather short; and that by judicious grooming it is easily possible to keep the coat from becoming too thick, thus avoiding the necessity of clipping. When this is the practice warm boiled food given one or two evenings each week materially adds to the luster. Horses thus managed will shed very early in the spring.

Under average conditions the horse that has a long,

thick coat will be greatly benefited by being clipped. The same is true of the horse that does not shed readily in the spring. The long coat causes the horse to sweat profusely, which drains heavily upon his system. Thus such an animal is difficult to keep in condition until clipped.

When the horse is to be clipped twice each year the first clipping should be soon after the hair has grown out in the fall. This gives time to become used to the change before cold weather, and there is some growth of hair before winter. The second clipping should be in the early spring as soon as the weather begins to get warm and before shedding the winter coat. The horse thus treated will be much more easily kept in presentable condition, and if protected by blanket and well groomed, will pay many times for such extra care.

When the horse cannot be properly blanketed either in the stable or out of it, he should not be clipped in the fall or winter. Animals exposed to the weather grow long coats for their own protection, and it is cruel to remove it when artificial protection cannot be supplied.

Mane and foretop.—When properly cared for the mane and foretop add to the attractiveness of the horse. On the hard-working horse, however, these may become very annoying, the foretop getting into the eyes and obstructing the vision, while the mane, in addition to being very warm, often becomes matted under the collar and produces a sore neck or sore shoulder. Under such circumstances it seems advisable to keep both mane and foretop closely cropped.

Blanketing the horse.—The efficiency of the horse can be increased, and his appearance improved by the proper use of the blanket. Sudden changes in the temperature, as well as cold rains and heavy winds, are very exhaustive on the work horse unless protective measures be taken. The blanket is also very useful in improving the general appearance of the coat of hair and in preserving its color.

Use of the stable blanket.—When stable blankets are used, two should be provided during the summer as well as during the winter. One, to be employed as a sweat blanket and used immediately after the horse returns from work and while he cools off, then to be removed and in a few minutes to be replaced by the night blanket, to remain on the animal overnight. In case the first blanket is left on the horse during the night, little opportunity is given him to dry off, the blanket soon becomes damp and remains so all night. This proves very exhaustive on the horse's system. In case the sweat blanket is replaced by a night blanket after the animal has ceased to steam and is somewhat cooled, which will be in a quarter of an hour, the hair will be dry and smooth the following morning. The evening grooming should be done after the sweat blanket is removed. Both blankets should be kept scrupulously clean at all times.

Stable blankets may be dispensed with in the hot summer months if the flies are excluded by screens or by some other means. If blankets are used at this time they should be of some light material and kept clean, otherwise they will do more harm than good. As soon as the nights begin to get cool, however, the use of the blankets should be continued, as an early use will arrest, to a marked degree, the growth of hair and may obviate the necessity of clipping.

Use of the outdoor blanket.—During the cold weather, when the horse is allowed to stand outdoors, he should be well protected with a blanket, otherwise he may chill. This precaution should always be taken even if we are going to stop but a short time, as the horse cools rapidly and may take cold. During very inclement weather it is a good plan to secure the blanket about the abdomen with safety pins. As warm weather approaches the heavy blanket should be substituted for a light one.

Use of the fly blanket and fly net.—The proper use of fly nets brings much comfort to the horse. Whether to

use nets or blankets will depend on the circumstances. The blanket, being much warmer and not so presentable as the net, is not advised by many persons; but there are conditions in which it proves very desirable, particularly on horses whose color is such as to fade on being exposed to the direct rays of the sun. Nets are more presentable and, therefore, more desired by horsemen generally. Both nets and blankets are rather annoying to the teamster, warm to the horses, and more or less expensive, for which reasons they are often discarded entirely. How-

FIG. 162.—FRENCH COACH GRADES, WELL HITCHED AND WELL GROOMED

ever, when the botflies are present, the work horse should always be provided with a throat latch cloth, as these flies are very annoying, and the animal in fighting them often becomes excited, with a consequent lessening of his usefulness.

Temperature of the stable.—The temperature in the horse stable may vary according to circumstances. The horse is thought to be a native of the north, and can endure almost any temperature so long as the stable is dry and free from drafts of air. Above all things, however, we must avoid changes, as taking a horse from a stable provided with artificial heat and compelling him to stand

in a cold one. This may prove fatal. To take him from a cold stable and compel him to stand in an artificially heated one may be almost as bad. If the horse is properly groomed and provided with a dry, clean bed the temperature of the stable may vary in accordance with that of the climate.

Bedding the horse.—The horse should be provided with a dry, soft bed. The hard-working horse needs rest at night, and he can rest much more comfortably if given a good bed. The bedding should be kept fresh and clean. To this end it is very important that the stalls be cleaned each morning. The unsoiled bedding may be placed in front of the horse under the manger, but the soiled bedding and the manure should be removed. The manure should also be removed in the evening before the bedding is shook out and arranged for the night. Never allow the stall to become foul, as this not only lessens the comfort of the horse but promotes disease as well. Wheat straw makes the best bed. Old straw is preferred, as it is drier and more elastic, thus making a soft bed and acting as a good absorbent. When straw cannot be obtained, or when it is high in price, shavings from the planing mill make a sweet, clean bed. Many persons prefer this material, as it leaves an agreeable odor in the barn. Other materials that are sometimes used are rejected portions of corn stalks, tan bark, peat moss, leaves, and the like.

Care of the horse's teeth.—The teeth of the horse are subject to many irregularities which prevent him from thoroughly masticating his food. The upper jaw is somewhat wider than the lower, so that the teeth are not exactly opposite; thus the wear is not equally distributed, and as a result sharp edges are often left unworn on the inside of the lower molars and on the outside of the upper, which may cut or lacerate the tongue or cheeks, which become sore. When the horse attempts to eat, the food materials irritate the sores and he will not feed

well. These sharp edges should be rasped down with a guarded rasp.

The teeth of the growing colt should be watched closely to see that they appear regularly and uniformly. This is very important when the milk teeth are being replaced by the permanent teeth (p. 51), as the former often persist, thereby causing the latter to grow in crooked or

FIG. 163.—SADDLERS, WELL GROOMED AND WELL TRAINED

irregular. To avoid this, the persistent milk teeth should be removed with forceps.

In all cases when a horse quids his food, slobbers or otherwise evinces pain in mastication, as shown by holding his head to one side while chewing, the teeth should be carefully examined. In addition to not feeding well, a horse with a sore mouth is likely to drive badly, to pull to one side, not to bear on the bit, or to bear on too hard, to toss the head, to start suddenly when a tender spot is touched, and the like.

Care of the horse's feet.—Formerly much of the literature on the horse pertained to the anatomy and care of the feet. The early writers recognized the very great importance of the feet. At present more attention is given to the general conformation and the general appearance, and the feet are being neglected, with the result that many of our breeds of horses have notably poor feet. Because of the importance of the feet, they should be carefully cared for throughout the active career of the horse. Each evening after returning from work, as well as in the morning before being sent out, the soles of the feet should be carefully examined and all foreign materials removed. Frequently nails, stones and other foreign materials are found driven into the sole, or collected in the cleft along the frog. It is very essential that all such materials be removed if the hoof is to remain in a healthy condition.

Some hoofs have a tendency to dry out, thus becoming hard and brittle. Such hoofs should be packed with clay mud and left on overnight. This will soften the wall of the hoof and make it less likely to crack or break. For this purpose some persons prefer oil or hoof ointment, but the mud leaves the hoof in a better physical condition. Should the hoof become broken or worn in such a way as to throw the foot out of line, it should be leveled at once, otherwise the weight of the body will strain the joints and cause deformity and disease. Further, when the horse is closely confined to the stable the hoofs grow out long and if not trimmed may deform the limb and make traveling difficult. It is very important that such feet receive proper attention and be trimmed with a rasp.

Growth of the hoof.—We are often interested to know the rate of growth of the hoof so that we may estimate how long it will take an injury, such as a cleft, calk or crack, to grow out. While the rate of growth is influenced to some extent by the work, exercise, grooming, moisture and food, yet the time required for the hoof to

grow from the coronet to the ground is in approximate proportion to the distance of the coronet to the ground. On the average, the hoof grows one-third of an inch a month, although hind hoofs grow faster than fore hoofs, and unshod ones faster than shod ones. The toe, therefore, grows down in nine to twelve months, depending on its length, the quarters in six to eight months and the heel in three to four months.

The hoof often grows out irregular, sometimes showing rings of growth. This is frequently noticed on horses that are confined to soft lots and foul stables, where it is due to the soft footing. This irregular growth can be avoided by leveling the hoof so the weight bears equally on all parts, and by placing the horse in a paddock with solid footing, thus providing the foot with the proper condition to function normally.

SHOEING THE HORSE

The horse should be shod as frequently as is necessary to meet the demands, which will vary according to the condition under which he is worked. In some parts of the country horses at moderate work are seldom shod; in other parts only the fore feet are shod; but the conditions in most of our country are such that the horse can perform his work more efficiently if kept properly shod.

Why the horse should be shod.—While there are a number of reasons for applying the shoes, the more important are to prevent excessive wear on the hoof, to prevent slipping on ice or mud, and to modify the action. The hoof of the work horse wears off faster than it grows out and soon becomes sore. To prevent this the shoe is attached. For this purpose the light shoe is preferred. It is difficult for the unshod horse to travel on the ice and through the mud; his efficiency is not only lessened, but he is liable to fall and injure himself and his driver as well. To pre-

vent this the horse is shod with shoes possessing sharp calks. There are several makes of shoes with removable calks. A smooth-shod horse is liable to slip more on the ice than a barefooted one. Many horses possess notably poor action, some overreaching, forging and clicking; others interfering, striking, cutting and brushing. In many cases this faulty action can be improved by proper shoeing. In such cases the shoes must be made and set to suit each individual animal.

Fitting the shoe.—In fitting the shoe to the hoof care must be exercised not to rob the hoof or leave too much horn, as either mistake may lead to injury. Of the many factors to be considered in preparing the hoof, perhaps the most important is to keep the foot perfectly level, thus preventing undue weight being thrown on any part, with all the attending injuries. The frog should not be touched further than to remove tags or layers that are so loose as to form no protection. The object sought is to make the foot normal, and then make the shoe fit the foot. In leveling the hoof, carefully note the wear of the old shoe. It gives evidence of the manner in which the hoof has been set to the ground since the shoe was nailed to it. The shoe should be fitted cold. Never place a hot shoe against a freshly pared sole, as it not only causes the animal pain but may lead to injury.

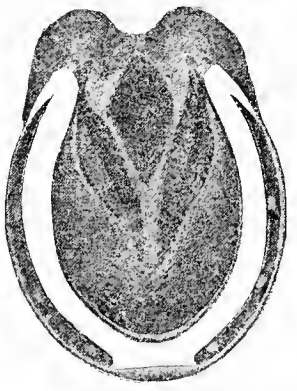

FIG. 164.—WELL-FITTED SHOE

Nailing and clinching the shoe.—In nailing the shoe to the foot the nails should not be driven too near the edge of the sole, for in such cases it is necessary to drive the nails too far up into the wall to make them hold. If

driven high, when the shoes are reset or the horse reshod, the former nail holes are near the edge and serve to weaken the hoof and interfere with driving the new nails. On the other hand, if the nails are small in size and set well back, they can be driven so as to come out well down on the hoof, say an inch and one-half above the shoe. Nails thus driven destroy the least possible amount of horn and have a wide, strong clinch, thus giving the strongest possible hold on the wall, because the clinch holds more nearly at right angles to the grain of the wall, than if driven high. After driving the nails they are clinched in a small groove fitted for the purpose. Smooth with a rasp, but never rasp the outside of the hoof, as it will remove the natural protective covering. It is of the utmost importance that this natural covering be not removed, as the hoof will absorb water in the wet season and dry out much more rapidly during the dry season.

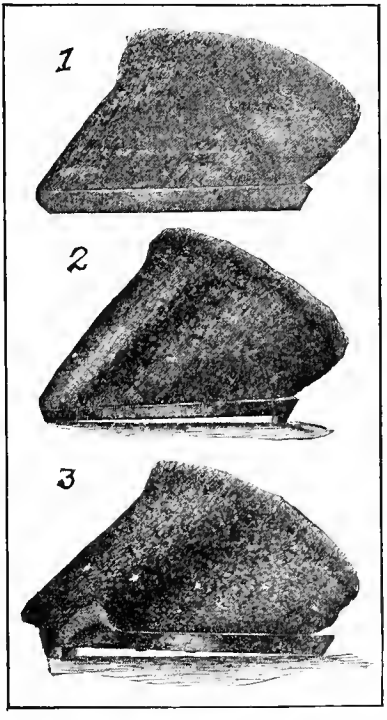

FIG. 165.—METHODS OF SHOEING
1, Normal position; 2, hasten the action; 3, retard the action.

Resetting the shoes.—It is important that the shoes be reset frequently, as the hoof grows out over the shoe, thereby causing the shoe to bear on the sole instead of

on the wall of the hoof. As to the frequency of resetting, all depends on the conditions, such as the severity of the work, the nature of the footing, whether icy or dirt, and the individuality of the animal. Some horses at very severe work may require the shoes to be reset every week, while others at light work may suffer no inconvenience if left on eight weeks or until the shoes wear out.

Shoes for unsound feet.—There are a great variety of horse shoes upon the market, many of which have been designed from time to time to save and perfect unsound feet. Such shoes may allay the pain and prolong the usefulness of the horse, but most of them allow dirt and filth to gather under the protecting pad. Because of the wet, dirty and filthy condition of the frog and sole of the foot, due to the dirt being retained by the pad and to the partial exclusion of the air, the foot tends to become soft, tender and diseased. Various forms of rubber pads, rubber shoes, rope shoes, fiber shoes and other contrivances to diminish the shock and prevent slipping on the hard slippery pavements of our large cities are in use. They are usually expensive, but many of them are rather efficient in deadening the sound and preventing slipping on paved and cement streets, though not so effective on ice.

CHAPTER XXXVII

PRACTICAL HORSE TRAINING

The usefulness and value of a horse depend on his training and on his being readily subservient to his master's will. The horse is man's principal beast of burden, and is constantly associated with him in the performance of his work. This association establishes a close relationship. Since the effectiveness with which the work is performed depends on their mutual understanding, it seems well worth while to give the methods of establishing agreeable relationships between horse and master careful consideration.

In common usage, the term "breaking" is employed to designate the preparation of the horse for his life work. This usage is unfortunate. Only too often the horse is broken in spirit and obeys, or, more accurately, does not resist his master because he is worked down and worn out and does not have the energy to resist. Throughout this book the term "training" is employed to signify the educating of the horse, as it conveys the proper meaning, the object being to train the horse so as to increase his efficiency, and not to break that high and superb spirit that makes him the most desired of all farm animals.

Training the foal.—The foal should be handled and taught a few simple lessons while young. It is so much easier to train the foal at this time, as he has fewer ideas of his own and fewer fixed habits. If the youngster is thrifty and strong, the very first day of his life is none too soon to begin the training, as we can show, rather than force him to do that which he does not understand.

Catching the foal.—The first time the young foal is caught he should be held in such a manner as not to

cause him fright. In order to do this we should make a careful study of the factors that govern the movements of the animal. If we touch the hindquarters, he moves forward, and if we touch the forequarters he moves backward. If a horse gets his fore foot over an obstruction of any kind and feels the pressure on the foot or leg, he moves backward until he frees himself, even though he injures himself in doing so, whereas he could very easily step over the obstruction by a forward movement. If the hind foot is fast he moves forward in a similar manner. Thus it is that pressure in front stimulates a backward movement, while pressure behind stimulates a forward movement. This is an important observation and perhaps the governing principle in all horse training, and should always be kept in mind when handling horses.

FIG. 166.—CATCHING THE FOAL

In catching a foal, gently place one arm under the neck and the other under the hams. If he attempts to go forward, apply pressure at the neck, or if he attempts to go backward, apply the pressure at the hams. If it is desired to have him step forward, relieve the pressure at the neck and apply it at the hams, or if it is desired to have the foal step backward, relieve the pressure at the hams and apply it at the neck. The young foal that is caught in this manner will soon become quiet, when he should be caressed. (Fig. 166.)

Secure the foal's confidence.—Young foals are naturally very timid and when caught should be handled very

gently. It is important to secure his complete confidence before he is set free. To do this feed him sweets from the palm of the hand; as sugar is sweeter than the dam's milk, it seems to give him the idea that we are his friend, and instead of fleeing as we enter the stall he will come to meet us, placing as much confidence in us as in his mother. In handling the foal, we should be careful to avoid confusing or exciting him. Extra care should be taken when handling the ears, the back of the fore legs, the flanks and the front of the hind legs, as these parts are extremely sensitive to the touch. The foal should be handled from both sides so as to become familiar with strange objects from every quarter. Teach the young foal useful things only. It is important to make the first lessons short and simple, and of such a nature that they can be understood very easily and even more easily accomplished.

Teach the foal to lead.—When the foal is about ten days to two weeks old he should be taught to lead. A web halter is preferable to a leather one, as it is much lighter and softer on the head. Never use a rope halter on a young foal. Adjust the web halter to the head, fastening up any loose straps that may be hanging down, as these annoy the foal. Do not be in a hurry, but let him get acquainted with everything as you proceed. When ready, coax the youngster along behind his mother on some accustomed route, as to the water trough and back. If sweets are available, let him taste them occasionally and he will soon follow promptly. If he resents, however, do not pull on his head, but take advantage of his natural instinct and apply pressure at the rear as we wish him to move forward.

Difficult to lead.—Secure a small rope, or sash cord, and tie a large loop in one end. This loop should be of sufficient size so that when placed in position on the foal it will surround his quarters, leaving the knot well forward on the back. Pass the free end along the back and

through the ring on the halter. This is called the quarter hitch. Now take the halter strap in one hand, the quarter hitch rope in the other. Pull gently on the halter strap and as the foal begins to shake his head give the quarter hitch rope a strong pull and he will immediately move forward. Do not hurry, but give him time

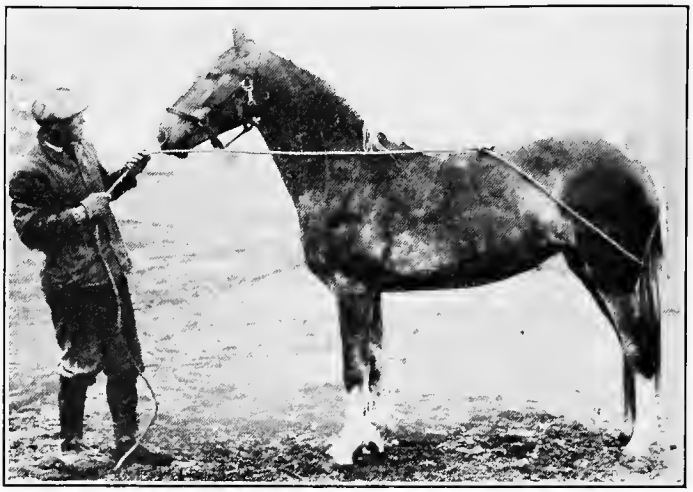

FIG. 167.—DIFFICULT TO LEAD

to get used to the lesson. Caress him and feed sweets. Soon he will follow wherever you lead. (Fig. 167.)

Teach the foal to drive with lines.—After the foal understands the use of the halter, he should be taught to drive with lines. To do this adjust a surcingle around the foal's body. The surcingle should be provided with a loop on each side, placed well below the center of the body. Pass the lines through the loops and fasten to the rings on the sides of the halter. Never use any kind of bit in the mouth of a young animal. Now the lines will pass the quarters low down and thus prevent the foal from turning his head toward us, which he will do occasion-

ally if the surcingle is not used. Keep the lines low in turning to make the guiding process easy. At first, walk close up to the foal so as to encourage him to go forward by occasionally touching the rump with the hand. Do not hurry the foal. The first day teach him to guide to the right and left, the second day of driving teach the command "whoa," the third day "get up," and the fourth day teach the command "back" (p. 379).

Training the work horse.—In training horses, young or old, there are a few general considerations that should be kept constantly in mind. A horse should never be trusted more than is necessary. Children, women or incompetent persons should never be left in charge of a horse unless the animal is thoroughly acquainted with them. In handling a horse, the safest way is to remain close to the animal's left shoulder, grasping the bridle close to the mouth with the right hand. In tieing to a post or hitching rack, the horse should be secured by a strong rope or strap placed about the neck, then passed through the ring of the bit and on to the post. In bridling, harnessing and saddling a horse the work should be done from the left side. In hitching, the lines should be attached into the bit and then placed where they can be reached easily before hitching the horse to the vehicle. In unhitching, the lines should be the last disengaged, and care should be taken that the animal is free from the vehicle before he is led away.

Age to train the horse for work.—There are many factors influencing the most profitable age at which to train horses for work, chief of which are the breed, the individuality and the work to be performed. As a rule, the draft breeds mature younger than the lighter breeds, and, therefore, may be put to moderate work younger. Some individuals develop more rapidly than others, and as they mature earlier, they may be put to work younger. The work performed likewise has a bearing upon the age of training. Draft horses and saddle horses, because of the

force applied at the collar and the weight borne on the back, should be reasonably mature; whereas among horses intended for fast driving on the race track, where the weight borne is light, many good horsemen feel that the training cannot begin too soon, and such horses are often put into training at a very early age.

Some persons find it profitable to put colts to moderate work as early as two and one-half years of age, and even before, while others delay training until coming four years

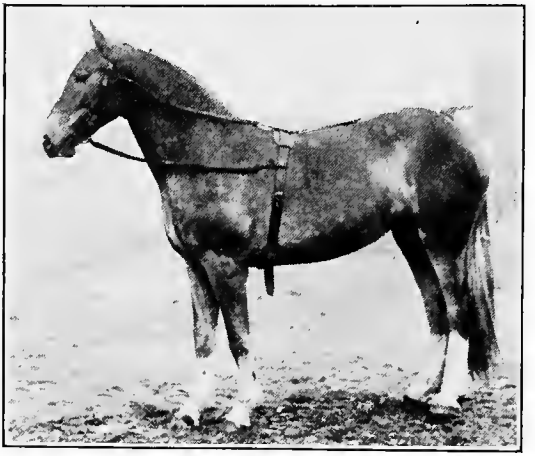

FIG. 168.—BITTING HARNESS

old. These ages represent the extremes. In general, the horse should not be put to work until two and one-half years of age, and even then the work must be moderate and the working hours short. On the other hand, if the animal is thrifty it is poor economy to keep him in idleness after he is four years of age.

Bitting the horse.—Perhaps no factor in the training of horses, whether for work or pleasure, is of greater importance than that of educating them to the uses of the bit. The thoroughness with which this is done will go

far toward determining their usefulness. Before bitting the horse, the mouth should be examined for sores, as it is not possible to train a horse to the uses of the bit while suffering from sore mouth. While the proper bit to use will depend somewhat on the object sought, yet in most cases a straight or slightly curved bar bit cannot be improved upon. In case the horse's mouth is tender the bar bit should be covered with rubber or leather.

The horse can usually be made familiar with the uses of the bit by the application of the bitting harness. This harness consists of an open bridle with check rein, a surcingle and crupper, and two side lines running from the bit to rings on either side of the surcingle. (Fig. 168.) With this harness properly adjusted, turn the horse loose into a paddock to familiarize himself with the bit. The side and check reins should be slack at first, but gradually tightened from day to day. The first lessons should not continue more than half an hour at a time, but two may be given each day. Subsequently the lessons may be longer. The number of lessons necessary to teach the uses of the bit will vary according to the individual. Some horses will drive after one or two, while others will require a week or more before they will fully understand its uses.

Teaching the commands.—As soon as the horse becomes familiar with the bit, the side reins may be substituted for lines, and he may be driven about the paddock. After driving the horse until he is going smoothly, give the command "whoa," followed by a strong swinging pull on both lines, and the moment the horse stops slacken the lines. If necessary to stop the horse, repeat the word and action. The next day teach the command "get up." When ready to start, give the command "get up," pausing a moment, then striking him a light tap with the whip. When going smoothly, stop at the command "whoa." Repeat until he obeys both commands promptly. Next teach the command "back."

The work horse should be taught few words, and each should stand for a definite action. Six words will answer all practical purposes, and it is important that the horse be thoroughly trained to obey each. "Whoa" means to stop and stand still; "get up," to go forward; "back," to move backward; "steady," to give attention; "haw," to go to the left; and "gee" means to go to the right.

Hitching and driving.—As soon as the horse obeys the commands he should be harnessed and hitched. To familiarize him with the pressure of the shafts he should first be poled. To do this, procure a light pole five or six feet long, and let the horse smell and feel it with his nose. Then gently rub the pole over the nose, face, neck and the entire body, especially along the inside and outside of the fore and hind legs.

If at all convenient, the first time the horse is hitched, a training cart—one with long shafts, substantially constructed, and the seat so arranged that the driver can get off and on quickly—should be employed. Before attaching to the vehicle, the horse should be made thoroughly familiar with it. To do this, lead the horse up to the rig and allow him to smell and feel the shafts. Rub them along his head, neck, shoulders, body and legs. Now the horse may be attached with perfect safety, although a kick strap should be employed at first.

Training the horse to objects of fear.—After the horse drives smoothly he should be made familiar with the various sounds and objects he is likely to meet, particularly along the busy thoroughfares of cities. To familiarize the horse with a street car, choose a road or street where the car line crosses, drive the horse up to within 100 yards of the track and stop until the car passes. If he seems nervous, caress him. Drive over the track an equal distance and stop while another car passes. This time the noise is in the rear. Repeat this process, working the horse closer as each car passes. In a similar manner familiarize him with other objects that cause him fright.

Train the horse to walk fast.—There is no gait so valuable or so much appreciated and so practically useful in a horse as a fast, square walk. It is not difficult to train the average horse to walk fast, providing the proper methods are employed in the early training. From the very beginning keep the horse walking up to his limit. We should never allow him to mope along at this time, or the habit will become so strongly fixed that it will be difficult to overcome. During the entire training

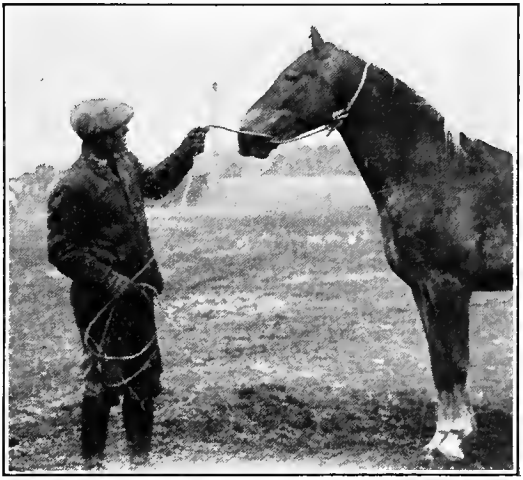

FIG. 169.—GUY LINE

process, therefore, urge him to his limit and he will get into the habit of walking fast.

Training the wild horse.—The training of stubborn, refractory and wild horses calls for more strenuous methods than have hitherto been suggested. Perhaps the greater number of such animals owe their faults to inequalities of temper. It is, therefore, of much importance that the temperaments be studied carefully. Horses may be divided into four general classes according to their tem-

per: Teachable, nervous, stubborn and treacherous (p. 19). The methods to be employed in training such horses will vary according to the individual, but the application of appliances somewhat similar to the following may be necessary to bring them under subjection:

The guy line.—This is a lead line or rope for controlling wild, refractory and stubborn horses. To make it, procure a soft, three-eighths-inch rope about 20 feet long. Make a small stationary loop in one end. Place this loop under the left jaw, carrying the free end over the neck

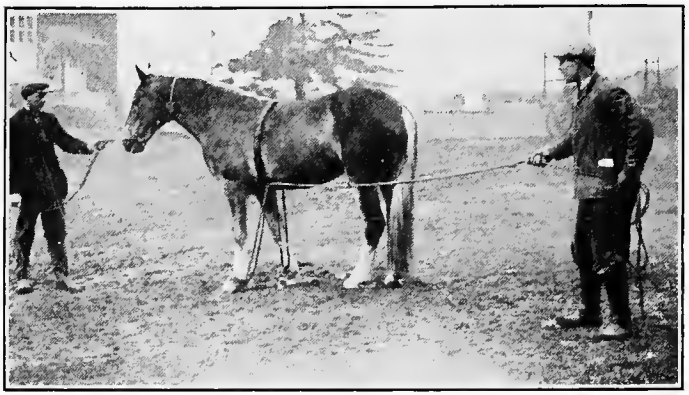

FIG. 170.—RAREY'S DOUBLE-SAFETY HARNESS AND GUY LINE

from right to left, then down through the loop and to the mouth, passing it through the mouth, back under the lower jaw and between the jaw and the rope coming from the neck, thus forming a loop around the neck and a half-hitch around the jaw. This makes a very efficient lead line, though it should never be used in prolonged pulls, but in short, quick jerks. (Fig. 169.)

Rarey's safety harness.—This harness was devised by Rarey for use in training wild and vicious horses. There are two forms, the single and double safety. In the former one front leg only is under control, while in the

latter both front legs are under restraint. This harness consists of two straps fitted with D-shaped rings, which are buckled about the pasterns; a surcingle fitted with two rings on the belly, three on either side and one over the saddle; and a long rope. To arrange the double safety, pass one end of the rope through the left ring at the belly, then down and through the ring at the left

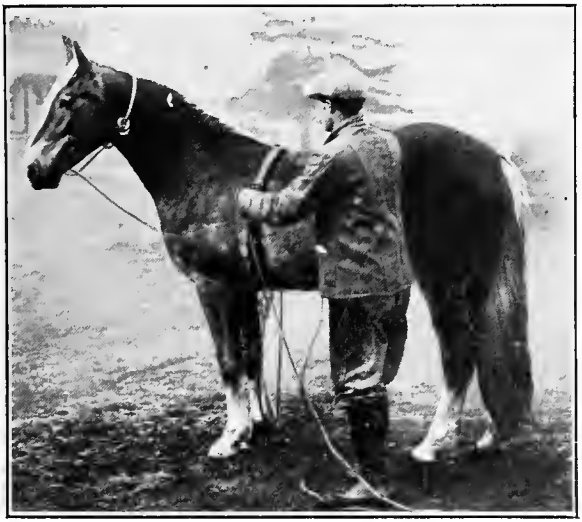

FIG. 171.—RAREY'S THROWING HARNESS

pastern, then up and through the other ring at the belly, then down and through the ring at the right pastern, then up and tie off at one of the rings on the right side. Now, by taking hold of the free end of the rope, we have the harness completed. In case the horse is difficult to manage, pull on the safety rope and restrain his fore legs. If he continues to act up, pull his fore legs up by a jerk on the rope and he will come to his knees. As this is a very humiliating position it serves to bring the horse under subjection. (Fig. 170.)

Rarey's throwing harness.—In the case of some wild horses it is necessary to lay them on the ground to teach them subjection. Rarey also devised a harness to accomplish this. It is practically the same as the safety harness, with the addition of a heavy strap, which is attached to the surcingle on the left side. One end of the rope is tied to the ring at the belly, the free end is passed through the ring at the right pastern, then the rope is passed up through one of the rings on the right side, and then on up over the back and the harness is completed. (Fig. 171.)

When ready to lay the horse down, first strap up the left fore leg. Take a position near the left shoulder and pull the horse's head to the left, then, as he lifts his right fore foot draw it up against the breast by pulling on the rope over the back. Pull steady on the rope, as the horse may rear. Soon he will settle down on his front knees, when to lay him down is simply a matter of pushing him over. Keep pulling on the rope, however, otherwise he may surprise you by quickly jumping to his feet. A few lessons of this kind will bring the wildest of horses under subjection, when they should be trained as suggested for the work horse, although it may be necessary to use the single safety for a time.

CHAPTER XXXVIII

WHIMS AND VICES OF THE HORSE

There are very few horses to be found in any vicinity but that have some faults which detract from their usefulness. These faults vary widely in their effect upon the horse; some are scarcely noticeable and affect the horse but little, while others are very serious and not only render the animal useless, but often make him positively dangerous. These bad habits may be divided into two general classes according to their seriousness: Vice and whims; the former comprising the more important moral defects, such as balking, kicking, running away, and the like, and the latter imperfections of less importance, such as tongue lolling, tearing blankets, gorging grain and the like.

Causes of whims and vices.—The chief cause of all bad habits of the horse is poor management at some stage of his career. Such habits may have been formed when the colt was small and when he is only too often made to do things that seem "cute." In later life these very things may serve to lessen his usefulness. They may have been formed while the horse was in training. Often the horse's mouth is spoiled by the use of a severe bridle-bit or an improperly fitting one. Often his shoulders, back and tail are made exceedingly sensitive to pressure by improperly fitting harness.

Many a young horse has been spoiled the first day he spent in the stable by the treatment he received. Many persons think a green horse should stand much the same as a work horse. Thus, if he appears indifferent and fails to stand over when commanded, or if he will not permit his sensitive abdomen and legs to be curried, or if he objects to having heavy harness with flopping bands thrown over his back, he is punished with the first thing the excited attendant

can lay hands on, with the result that a habit is established which may be exceedingly difficult to overcome. All such excitement and resulting bad habits easily can be avoided by a little patient effort in properly training the horse. It is seldom if ever that a horse is really born vicious. While it may be true that tempers are transmitted, and that certain tempers are more predisposed than others to develop vice, yet vice itself is not a hereditary character.

Overcoming whims and vices.—In overcoming bad habits in horses we should make a careful study of each case in order to ascertain the cause, and, if possible, remove it. Then we must establish a new habit that will have a stronger influence on the horse's mind than the old one which impairs his usefulness. To do this we must impress upon his mind that we are superior and our commands must be obeyed. From the beginning, therefore, we must use such appliances as will give us the advantage. This can readily be accomplished in either of two ways: First, by the application of such appliances as will use the horse's strength in overcoming him; and, second, by the use of self-punishing harness, which will inflict punishment at the instant he violates our wish.

The horse must be given to understand that he must obey us or suffer accordingly. Next, he must be impressed with the fact that we are his friend. This can be accomplished by caressing him and feeding sweets when he obeys our commands. To aid in securing his confidence we should abstain from all forms of punishment likely to cause him pain. Thus we should not use the whip or spur in overcoming bad habits, as the pain inflicted may provoke further rebellion.

The most efficient means of punishing the horse in overcoming faults is to humiliate him. This seems to have a greater effect upon the stubborn horse than any form of punishment whereby he is caused physical pain. There are two common methods of humiliating the proud

and vicious horse: First, by pulling him to his knees and holding him there until he becomes calm, which can be easily accomplished by means of the Rarey double safety; and, second, by laying him on the ground and holding him down until he gives in, which can be accomplished with the Rarey throwing harness. The great advantage of each of these methods is that they do not cause the horse physical pain.

Outdoor whims and vices, and how to overcome them.—There are a number of outdoor faults to which the horse is subject, some of which are easily overcome, while others are practically impossible, especially after the horse becomes confirmed in his habits.

Balking.—This is largely a nervous trouble, and it is useless to punish the horse, if indeed it does not increase the difficulty. We must divert the horse's attention from his fixed determination not to obey. In young horses this can usually be done by quietly arranging the collar or bridle; by giving a dainty, as a bite of grass; and by picking up one front foot and gently tapping the shoe as if there was something wrong. This serves to attract the horse's attention, and he will move on without further trouble.

In older horses and where the habit is fixed, more strenuous methods must be employed. First of all, teach the commands so that they are obeyed with promptness. If necessary use the double safety until the horse understands that "whoa" means to stop and stand still. Next attach the guy line, which should be managed by an assistant while you drive and tend the safety. If the horse shows any tendency to balk give the command "whoa" at once, and before he has time to stop of his own accord. This serves to puzzle him. When ready to start the assistant should quickly take a position in front of the horse and smartly jerk him forward with the guy line at the same time you give the command "get up." As a signal, you should snap the whip to the right, but without touching

the horse, as the command is given. Repeat the process of stopping, starting and snapping the whip several times. Use the guy line, and use it severely, on the slightest intimation that the horse does not want to go when commanded. After a few such lessons there should be no further trouble.

Kicking.—To overcome the habit of kicking, give the horse a thorough course in poling (p. 380). If he resists attach the guy line and double safety, pull him to his knees and continue the poling process. At first refrain from touching the hind legs, gradually working the pole back along the body. When he becomes submissive while down, let him up and continue the poling as before. Now place the harness over the double safety, arranging the breast band and breeching rather loosely, and placing the traces through the rings on the breeching, so that the ends will flap about the hind legs and quarters. If he resents the pressure on the harness and attempts to kick, give the command "steady" and pull him to his knees rather severely. Hold him in this position until he becomes calm. Continue the process until he submits.

Procure two long poles, secure one end of each on either side at the shaft tug, and allow the other end to drag on the ground behind the horse. Drive him about, and if he attempts to kick, command "steady" and pull him to his knees as before. After he becomes submissive to the poles dragging on either side, place them between his hind legs and continue as before. At this time care should be exercised, for the horse may injure himself. Do not continue this part of the lesson long, as the poles will rub the legs sore. If he resents this, however, pull him to his knees. Repeat until he submits.

Running away.—To overcome the habit of running away first make the horse thoroughly obedient to the commands and uses of the bit, much as suggested in the case of a balking horse. With the guy line and the double safety still attached familiarize him with strange objects,

such as papers, umbrellas, robes, and the like; and to sound, as sleigh bells and steam cars. Now pad the knees and hitch the horse to a vehicle. After driving him about for a time give him an opportunity to run away, choosing a straight, wide road. When he gets well under way command "steady" and begin to restrain his front feet with the safety rope. Slacken him gradually until slow enough to permit a sudden stop, then give the command "whoa" and bring him to his knees. Repeat this a few times. Now try him again and just before applying the safety rope give him a severe pull on the lines in order to impress him that we have the same power with the lines that we have with the safety rope. Continue this work, driving the horse past objects that formerly excited him to run. After a few rather hard falls he will usually become submissive.

Tossing and shaking the head.—Many otherwise good driving horses have the very aggravating habit of tossing the head up and down, or throwing it from side to side. Such nervousness not only detracts from the general appearance of the horse, but makes him difficult to drive properly, as he pulls the lines through the hands and may throw the lines over the end of the shaft and an accident result. Such habits are often difficult to overcome. First examine the mouth to see that it is free from sores and that the bit and bridle are properly adjusted. Procure a short strap about six inches long provided with a snap on either end and a loose ring in the center. Snap the leather to the bit rings so the loose ring on the leather will remain under the lower jaw. Now secure a strap to this loose ring, pass it down between the front legs and attach to the belly band, similar to a standard martingale. When the horse is properly reined this is a very effective appliance, as he is unable to move the head out of position.

Tongue-lolling.—Many good driving horses have the disagreeable habit of protruding the tongue from the

mouth. This is very unsightly and lessens the sensitiveness of the mouth, besides exposing the tongue to injury. The habit is usually due to improper bitting and is often difficult to overcome. The tongue-lolling bit was devised to overcome the habit and is perhaps the most effective measure that we have at present. (Fig. 174; 15.)

Halter-pulling.—There are three hitches in common use in overcoming the habit of halter-pulling, the loin-hitch, the tail-hitch, and the foot-hitch. To arrange the loin-hitch secure a three-quarter-inch rope about 15 feet long, and tie a small stationary loop in one end. Place the rope around the horse's body just in front of the hips with the loop under the abdomen, and run the free end through the loop, pass it forward between the fore legs, up through the ring at the halter, then around a solid post, and back and tie into the ring at the halter. Now excite the horse to pull back. The moment he feels the pressure around the body he bounds forward. To avoid any further trouble, force him back into the rope severely by tapping him across the nose with the whip. This causes him to go back into the rope with much force, which, coupled with the fright caused by the whip at the nose, never fails to bring him forward. Caress him while he stands by the post. After a few such struggles it will be difficult to get him to pull back.

In overcoming halter pulling some persons prefer the tail-hitch, although it is rather severe. To arrange the tail-hitch, tie a stationary loop in one end of the rope sufficiently large to go about the tail similar to a crupper, passing the free end forward through the turret at the saddle, on through the ring at the halter, then around the post, and back and tie into the halter ring as before. With this appliance the pressure is brought to bear at the tail, a very sensitive part, and he bounds forward. This hitch is likely to abrade the tail. To arrange the foot-hitch, secure one end of the rope about a pastern, pass the free end up through the ring at the halter and

on to the post, then back to the halter and tie as before. Now when the horse pulls he jerks one leg out from under him, which puzzles him so greatly that he soon ceases to pull back.

Stable whims and vices, and how to overcome them.—Horses are even more likely to develop bad habits in the stable than outdoors, particularly if ill-treated or denied sufficient exercise. These habits are often very dangerous and usually lessen the usefulness of the horse possessing them.

Difficult to harness.—Some rather nervous horses have very sensitive skins and, if not properly trained, may be difficult to groom and harness. Many horses are especially sensitive along the abdomen, the back of the fore legs and the front of the hind legs, and care should be exercised in handling these parts. To overcome horses difficult to groom, harness or crupper, first pole them thoroughly as suggested for a horse that kicks. After becoming submissive to the pole, arrange a noose twitch or a war bridle on the horse.

FIG. 172.—NOOSE TWITCH

To make a noose twitch procure a small rope, such as a sash cord, and at one end tie a small stationary loop. Hold this loop on the right side of the horse's head, placing the free end of the rope over the head just back of the ears, down the right side and in the mouth just under the upper lip and on top of the teeth, and then up and through the loop at the right side of the head and the twitch is completed. (Fig. 172.)

To make a war bridle take a small rope, as a sash cord, and tie a small stationary loop in one end just large

enough to go in the horse's mouth and around the lower jaw. Place this in the horse's mouth with the knot and free end on the right side. Bring the free end up over the head, down the left side and through the loop at the mouth. Now pass the rope back over the head, this time from left to right, and just back of the ears, then down the right side through the mouth under the upper lip and on top of the teeth, and then pass the rope through the part which passes over the head and the bridle is completed. (Fig. 173.)

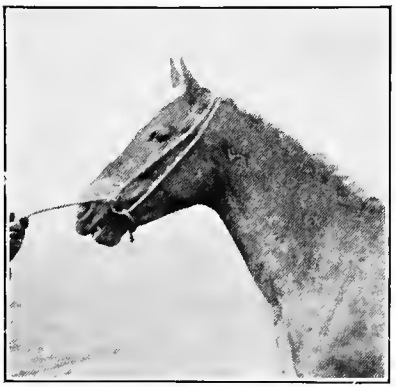

FIG. 173.—WAR-BRIDLE

With either the noose twitch or war bridle attached, we are in a position to punish the horse by jerking on the rope should he attempt to resist as we harness or groom him. Continue with the appliance until he becomes perfectly submissive to being groomed or harnessed. To complete the work, in a similar manner, educate him to stand while being harnessed from the right side.

Biting.—When the horse is troubled but mildly, biting can be overcome by the use of the war bridle. Place this on him, and when he attempts to nip, punish him severely with the bridle. Now tempt him to bite, and then punish him if he does. Soon he will associate the punishing with the nipping, and will cease. If he still persists, apply the wooden gag. This gag is made from a block of hard wood, about five inches long and 1½ inches square. A hole is bored through the center, longways, for a chain which is attached to a headstall. The gag is then put in

the mouth the same as a bridle bit. Now should the horse attempt to bite the corners on the gag cut his gums. A few lessons, one each day, will serve to overcome most biters.

Tearing blankets.—When standing in the stable many horses have the habit of biting and tearing their blankets. To overcome this, attach one end of a bar to the halter and the other end to a surcingle. As this prevents the horse from turning the head to either side, he cannot reach the blanket with his teeth. Another device is made by using a noseband and suspending small, short chains from the front, back and side in such a form, that when the horse turns to get hold of the blanket with his teeth, the chain appliance prevents him from doing so. This has the advantage of the muzzle in that the animal can eat with it attached.

Gorging grain.—There are many methods of overcoming the horse that eats greedily, often swallowing his grain without mastication. A very good plan is to feed the grain in a large, flat-bottomed grain box, as this prevents the horse from getting much grain at a mouthful. Some persons feed the grain on hay, and others recommend placing round stones in the grain box, but the confirmed grain gorger is usually an adept at throwing stones out before eating the grain.

Rolling.—To overcome the habit of rolling in the stall, secure a small ring and sew it in the top of the halter. Suspend a small rope from the ceiling so that it will hang directly over the horse's neck when standing at the manger. Attach a snap to the lower end of the rope, and snap into the ring at the top of the halter. This rope should be long enough to allow the horse to get his nose to the ground. This will permit him to lie down, but as he cannot place the top of his head on the ground he is unable to roll.

Difficult to shoe.—Because of improper training many horses are difficult to shoe. To overcome this habit,

first pole the legs thoroughly as suggested for the kicker. Next attach the war bridle and gently run the hand down the left shoulder toward the leg. If the horse resists punish him with the bridle. Continue working the hand down the leg and punish with the bridle, until he submits. Lift the foot, and if he resists strap it up as in throwing with the throwing harness. Now lead him about on three feet for a few minutes to teach him to balance himself. If he attempts to settle down on one knee punish with the war bridle. Change the leg strap to the other side and gentle the right front foot in a similar manner.

To gentle the left hind foot, rub the hand along the body and down the hind leg to the hoof, punishing with the war bridle if he resists. Attach the rope to the left hind pastern. If he attempts to kick, strap up the left fore foot. Should he attempt to kick in this position he will throw himself out of balance and fall. As soon as the rope is secured to the hind pastern, unstrap the front one. Now have an assistant take this rope and attempt to lift the foot with it, first standing well in front and out of the horse's reach should he attempt to kick. If the horse refuses to lift the foot, give several sharp jerks on the war bridle, when he will usually raise it. Next have the assistant take a position in the rear, and try to lift the foot as before, standing well back behind the horse. If the horse refuses, punish with the bridle, when he will usually lift it. Gentle the other hind foot similarly.

CHAPTER XXXIX

HARNESSING THE HORSE

The various parts of the harness should be properly adjusted, as a perfectly fitted harness adds much to the horse's comfort and increases his usefulness. The horse not only accomplishes his work by means of the harness, but receives much of his information concerning our wishes by it as well. Thus unequal pressure due to poorly fitting harness is likely to abrade the parts and leave the impression with the horse that we are punishing him, which may provoke vicious habits. This is emphasized by the fact that a sore mouth produced by a poorly fitted bit or bridle often excites the horse to running away; a sore neck or shoulders, the result of an ill-fitting collar, often induces the horse to balking; and a sore tail, produced by an improperly adjusted crupper, often provokes the horse to kicking. Since not only the usefulness of the horse, but his safety as well, depends so largely upon the adjustment of the harness, much careful consideration should be given to the harnessing of the horse.

Bridle and check rein.—Since the bridle and bit is our main reliance for conveying orders to the horse's mind for execution, it is important that it be properly adjusted so as to retain the natural sensitiveness of the mouth. A responsive mouth contributes to the efficiency and safety of the horse. A good mouth—one with sensitive bars—is natural to the horse. "Tender," "hard," and all kinds of "spoiled" mouths result from improper training and handling. When we recall the extreme tenderness of the horse's mouth, the cruel manner in which it is often fitted and the pain resulting from the sores thus produced, we can appreciate why a horse may lag behind until the parts

become numbed, then begin pulling on the bit, going with mouth open, holding the head to one side, lolling the

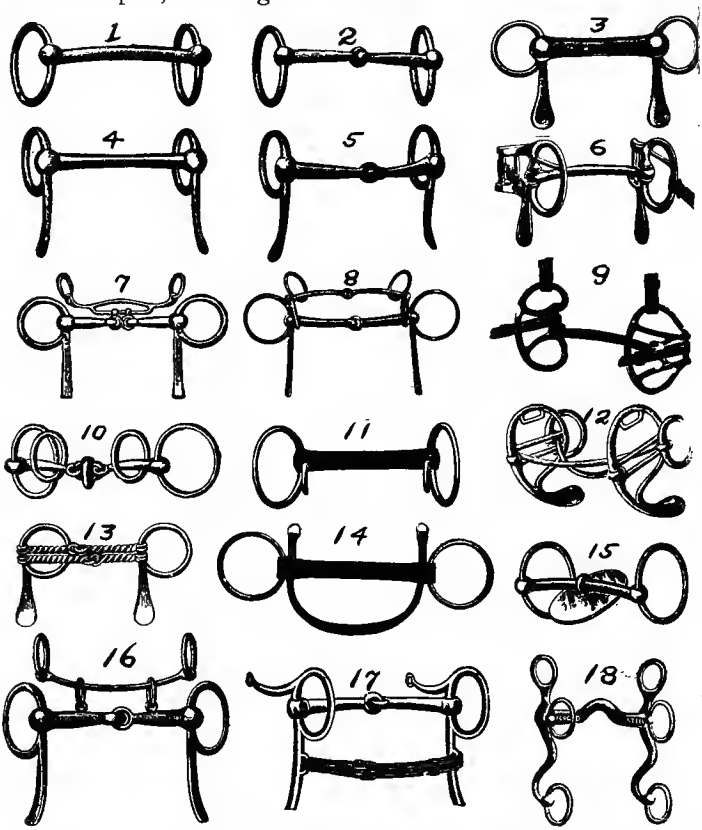

FIG. 174.—TYPES OF BRIDLE BITS

1, bar bit; 2, jointed bit; 3, chain center soft rubber bit; 4, bar bit, half chee. 5, jointed bit, half cheek; 6, triumph bit; 7, Victor bit; 8, Norton bit; 9, Success bi 10, Sanborn bit; 11, regulation bit; 12, J. S. C. bit; 13, W. wire bit; 14, humane bit; 15, tongue-lolling bit; 16, Perfection bit; 17, Lecompt bit; 18, riding bit.

tongue, slobbering, rearing, mixing the gaits, and in many other ways showing the discomfort he is suffering.

The bridle bit.—As a rule, in the control of the horse,

too much is expected from the bit alone. Some persons seem to think that by using a severe bit they should be able to control the horse, even though he has not been properly trained. Because of this feeling many types of bits have been devised to meet the various and peculiar habits of the horse, most of which have been designated to punish him and to irritate the sensitive parts, thus defeating the object they were devised to accomplish. In the control of the horse it must be remembered that if the bit is to be effective, it is essential that the bars of the mouth retain their natural sensitiveness, which can be attained by the use of an easy and light bit handled with care.

Bridle bits may be classified in two ways: First, according to their form, such as straight bar, jointed and curb; and, second, according to their function, as mild, medium and severe. The straight bar bit consists of a solid mouthpiece without lever action. It is the mildest form of bit, as there is a minimum amount of pressure on the bars of the horse's mouth. The jointed or snaffle bit consists of a jointed mouthpiece, also without lever action. This is a mild bit, although considerable pressure may be brought to bear upon the bars of the horse's mouth. Curb bits are made in a number of styles, but each consists primarily of a solid mouthpiece, which may be straight or slightly curved. This bit is used with a curb chain or strap attached and a lever action is obtained, the efficiency of which depends on the manner in which the bit and chain are arranged. There are also a number of styles of severe bits upon the market, each having for its main object that of punishment, which is always to be avoided, as it destroys the natural sensitiveness of the mouth. These bits usually consist of double bars so arranged that when drawn tightly by the lines they have a tendency to pinch the jaws and may cause the horse much pain. (Fig. 174.)

The straight bar bit is useful for horses with tender

mouths. To make the bit still more mild, it is often covered with leather or rubber. Not only are bits of this type used on animals with very tender mouths, but they are very efficient in overcoming bad habits where severe bits utterly fail. The jointed bit is a very useful type, and many horses work more agreeably with it than with the bar bit, as it gives more room for the tongue. The severe bit should never be used unless it is absolutely necessary, as it is likely to result in more harm than good. While the mild bit is the one to use as a general rule, there may be times when a severe one is needed. Because of this, several attempts have been made to construct a bit that can be variously applied, so as to form either a mild or severe one as desired.

The curb bit is used to improve the action of driving and high-acting horses. Thus the horse properly fitted with a curb bit gets his head up and nose in and shows himself to much better advantage than with any other kind of bit. However, the curb bit should be used only by those who are familiar with it, as it may become a very cruel instrument in the hands of the inexperienced.

Head stall and blinds.—The comfort and usefulness of the bit depends largely upon the adjustment of the cheek straps. The bridle should be so adjusted as to keep the bit in its proper place—right across the bars of the mouth just above the tushes. This is very important, for if the cheek straps are too long, then the bit drops and is loosely applied, with the result that the horse becomes careless and unmindful of our wishes. On the other hand, if the cheek straps are too short, then the bit is drawn upward into the angles of the mouth and becomes a constant source of annoyance to the horse and may produce a sore mouth.

The advisability of using blinds on the bridle depends largely on the conditions. During the training period blinds should not be used. No horse can be said to be trained until he is familiar with objects at all angles, and

this can be accomplished only by the use of an open bridle. After training, however, there is no important objection to the use of blinds, although even then they add weight, are warm in summer and very annoying to the horse. When blinds are used they should be of the same height on the horse's head and firmly attached to the bridle so they cannot swing back and forth.

The check rein.—The efficiency of the horse depends much upon the manner in which the head is held. If the horse is given the freedom of his head he is likely to become careless in his habits and shambling in his gait. On the other hand, if the head is checked too high the animal's usefulness is lessened thereby, as he cannot apply himself. There are two common methods of checking the horse's head: First, by the means of the side rein, and, second, by the overdraw check rein. The former is used largely on work horses and the latter on driving horses. While the side rein is not so effective in holding the head up, it is more comfortable and enables the horse to perform his work more effectively. He is not so likely to stumble, and will pull a much heavier load. This is because he has more liberty with his head, thereby enabling him to see the ground immediately in front, and to lower the head, thus throwing more power into the collar.

While the overdraw check rein holds the head higher, yet there are many objections to its use. This rein was devised for trotting horses, to be used for short periods of time only, and where the surface was as smooth as the floor. At present, however, it is used almost exclusively on driving horses, on all kinds of roads, and for indefinite periods of time. When so used there are many strong objections to the overdraw check, chief of which are that it holds the head in such a position that the animal is unable to see the ground immediately in front of him, and he has not the freedom to apply himself so as to pull effectively, particularly in ascending a grade. He is

unable to lower his head, and hence can put little power into the collar. Further, when reined too tight it holds the head and neck in such an unnatural position that they soon become numbed and the horse is seen to toss his head from side to side and to take other characteristic attitudes in search of relief.

Collars.—The service of the horse is very largely accomplished by means of the collar, and it is of the utmost importance that it fit the neck and shoulders perfectly. The unequal pressure due to a poorly fitted collar causes

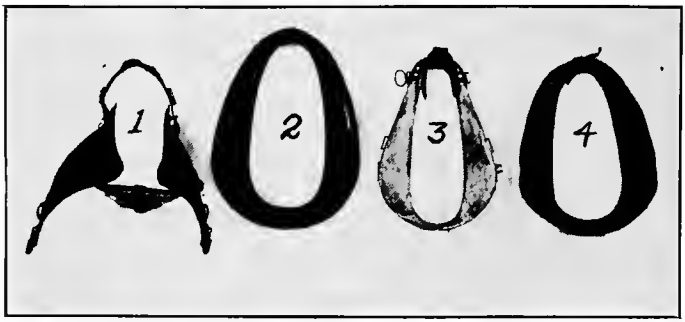

FIG. 175.—TYPES OF COLLARS
1, Humane; 2, pneumatic; 3, steel; 4, leather.

the horse much pain and often results in a sore neck or sore shoulders. Such sores are a rather common cause of vicious habits among horses, particularly balking, striking and kicking.

Kinds of collars.—Because of the difficulty in keeping the neck and shoulders in a thrifty condition, many types of collars have been devised to meet the needs of the horse. Chief among these types are the various styles of the common leather; the pneumatic, the metal, and the humane. The adherents of each of these types assert superiority over the other. The humane collar differs in shape from any of the others. It consists of a metal frame and two broad leather pads, one for either shoul-

der. The pneumatic collar consists of a metal frame lined with rubber, which is inflated similarly to an automobile tire. The bearing surface of a metal collar is shaped somewhat like that of a leather collar, and all the parts are of metal. (Fig. 175.)

While all kinds of claims are made by the adherents of these patent collars, the leather collar still holds first place among horsemen generally. To meet the various needs of the horse, leather collars are made in many shapes, chief of which are full sweeny, half sweeny, kangaroo leather face, Irish or cloth face, common leather face, and the like.

Fitting the collar.—To avoid sore neck and sore shoulders the collar should be properly adjusted. Leather collars are so firm and stiff that it is difficult to adjust them to the neck and shoulders. To overcome this difficulty take the poorly fitting collar, new or old, wrap it round and round again with thoroughly wet sacking and let it remain overnight. In the morning place it on the horse, and with the hame straps adjust it snugly to the shoulders and neck, then work the horse moderately through the day. Soaking the collar in this way serves to soften it and then it will adjust itself to every inequality of the shoulders and neck, so that the horse will seldom be troubled with soreness. The shoulders of no two horses are exactly alike, and each should have his own collar.

Sweat pads and housings.—A collar that will fit in the early spring when the horse is fat may be too large later, when he is worked down, so that it may be necessary to use pads or get another collar. Sweat pads, however, are rather objectionable, as they are very warm and the neck and shoulders can be kept in a more healthy condition without them. When the pads are used they should be kept clean.

Horses that work in the winter, or during the rainy season, should have their necks protected by housings,

as these serve to keep out the water. While these housings are rather expensive, they will prove economical for the working horse during the winter season because of the protection given the neck and shoulders.

Breast harness.—For light driving, the breast harness is preferred to the collar. It is lighter and cooler and when properly adjusted does not interfere with the action so much as collar harness. In fitting breast harness care

FIG. 176.—HEAVY WORK HARNESS

must be exercised in adjusting the neck strap, for if too long, the harness will drop and interfere with the action of the fore legs, or if too short, the harness will be drawn up and choke the animal, particularly in ascending a grade.

Crupper and back strap.—To meet the needs of the horse a variety of types of cruppers have been devised, some of which are very large, for preventing a horse from dropping his tail down on the lines and for improving the general appearance. The medium-sized crupper, free from folds, is recommended. In fitting the crupper extra care must be exercised in adjusting the check rein and back strap, for if either are too short the crupper will be

drawn tightly against the tail. The under part of the tail being very tender, this is likely to cause soreness and thus lessen the reliability of the horse, as the horse with a sore tail is often difficult to control, particularly when he gets his tail over the line. On the other hand, if the back strap is too long and the crupper too loose it may result in the harness sliding to one side.

Saddle and back band.—The importance of the saddle and back band depends on the arrangement of the breeching and holdbacks. If the holdbacks are so arranged that in backing pressure is brought upon the saddle, it is important that it be properly fitted. Often this is neglected and a sore back results. With the saddle in its proper place on the back there is little or no danger that the horse's back will become sore or abraded, particularly if the parts are kept smooth and clean. If there is extra pressure on the saddle, as is often the case when hitched to single rigs, saddle pads should be used.

Breeching and holdbacks.—Where there is much backing to be done, or in sections of the country that are hilly or mountainous, the breeching and holdbacks assume much importance. While there are a variety of types of holdbacks on the market, they can be divided into four general classes: Breeching and shaft holdbacks, yoke and collar holdbacks, breeching and belly martingale holdbacks, and Boston holdbacks. These holdbacks may be attached in a variety of ways. The breeching is commonly employed with each except the yoke and collar holdback. The saddle may be discarded in the breeching and belly martingale holdback as well as in the Boston, in which case crotch back straps and hip straps are usually employed.

The breeching and shaft holdback is used only with single rigs and the breeching is attached directly to the shaft by means of holdback straps. The holdback straps must be properly adjusted. If too short, they draw the horse forward, and interfere with his action, whereas if

too long the breeching hangs loose and the rig will have a jerky motion.

The yoke and collar holdback is intended only for light rigs. The backing is accomplished very largely with the neck by means of the yoke and collars. Sometimes a martingale is used, and a part of the backing is accomplished by pulling down on the saddle. With the breeching and belly martingale holdback, much of the backing is accomplished by means of breeching, though extra pressure is often brought to bear on the top of the neck. While this is a more efficient backer than the yoke and collar, both are open to the same general criticisms in respect to producing sore necks.

FIG. 177.—LIGHT DRIVING HARNESS

In case the loads are heavy and there is considerable backing to be accomplished, the Boston holdback is recommended. The backing is accomplished with the breeching by means of tugs extending from the breeching to the jockey yoke. The draft, therefore, is in a straight line from the end of the tongue to the quarters, thus giving the horse his maximum efficiency in backing. This is by far the easiest on the horse, as there is but little pressure on the neck and none on the back.

Care of harness.—Harness should receive good care, as this will increase the length of its usefulness and lessen the liability of its injuring the horse. When not in use,

it should be covered with a sheet and hung in a room constructed especially for it, as dust, dampness and vermin tend to injure the leather and tarnish the fixtures. It is very important that the bearing parts be kept scrupulously clean at all times. This applies especially to the parts in constant contact with the horse, as the collar,

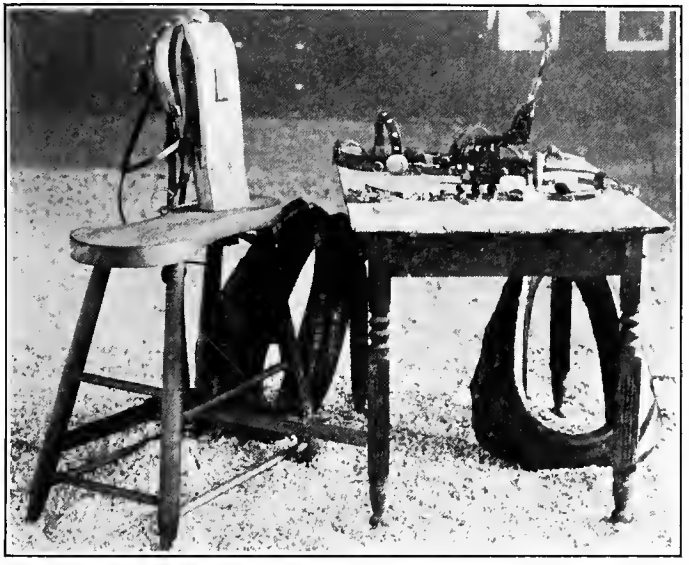

FIG. 178.—HARNESS REPAIR KIT

saddle, crupper, and the like. It is not possible to prevent sores if these parts are permitted to become dirty, which they will, because of the sweat and dandruff. The collar, saddle and crupper should be thoroughly cleaned each morning before harnessing.

The entire harness should be oiled frequently. The simplest way to do this, especially with work harness, is to take it apart and soak the parts for fifteen minutes in a tub of lukewarm water containing a handful of wash-

ing soda. Then scrub the parts with a scrub brush, and when dry oil with neatsfoot oil to which a small amount of kerosene and a little lampblack have been added. Now hang up to dry, exercising care not to dry in the sun or by the fire. When thoroughly dry sponge with castile soap and buckle the parts together. Common harness treated in this way will neither turn red nor become gummy, and if often sponged with white castile soap, can be kept looking like new.

Repairing harness.—Where many work horses are kept a harness repair kit should be available. It is convenient as well as economical to be prepared to mend harness whenever needed, as it often saves delay in sending to the shop. To make simple repairs is not difficult, and a repair kit is inexpensive. We should provide a wood clamp for holding the leather while stitching, gauge knife to cut new straps, four-tube punch, a paper of needles, ball of thread, ball of wax, three different size awls, collar awl, rivet set, box of assorted rivets, and a pair of pliers. Such a kit can be obtained for approximately five dollars, and with it one can keep his harness in the best of repair at a very small cost. (Fig. 178.)

CHAPTER XL

THE PRACTICAL HORSE BARN

The planning and construction of all buildings on the farm should receive careful consideration. They should be adapted to the environment. Features of the natural landscape give character to the homestead. It is a common error to give little thought to the placing of buildings, either in relation to each other or to the surrounding conditions. There are many fine homes that owe their beauty and much of their value to the arrangement of the buildings, lawns, gardens and fields.

The horse barn, in common with the other buildings, should be planned to meet the attendant conditions. No one type of building is of universal suitability. The farm barn must fit the farm and the needs of the farmer, while the city barn must be planned to meet the individual conditions. On the average farm there is but one barn, which must house all the animals, with the possible exception of swine and poultry. Because of the variety of conditions under which horse barns are planned no attempt is made to suggest a type, and only a few of the more important essentials, which apply in the construction of all buildings where horses are housed, are considered.

Essentials in location and construction.—The horse barn should occupy a subordinate location in relation to the house. It should occupy a position so that the prevailing winds will not carry the stable odors toward the house. The exact position and arrangement of the outbuildings and inclosures will vary according to use, and to be convenient should be few and compact, rather than scattered over a large area.

Drainage.—In choosing a location for the horse barn consideration should be given the natural drainage. This

FIG. 179.—HORSE BARN, SHOWING PAVED COURT AND TEAMS READY FOR WORK

is often overlooked and many barns are so situated that it is practically impossible to drain the soil sufficiently to prevent muddy lots with all attendant disadvantages. Choose a slightly elevated location if possible, so that the water naturally will drain away in all directions. Dryish, sandy soil is preferred, as the water drains out readily and there is no trouble from mud about the barn. Throughout much of the country, however, the best that can be done is to locate the barn on slightly sloping land, which should be well underdrained before the barn is constructed. Any protection against prevailing north and west winds in the winter season, such as hills, trees or any other natural objects in the track of the regular storm, should be made use of, but cool and refreshing winds should not be hindered in their direction during the summer.

Ventilation.—In the construction of the horse barn one of the most important considerations is thorough ventilation. It is essential that the hard-working horse be supplied with an abundance of fresh air while he is resting. Not only does a damp and poorly ventilated stable lessen his efficiency, but it also increases the liability to disease. It is comparatively easy to ventilate the horse stable, as the horse does not suffer from the cold so much as some other farm animals. If the introduction of an abundance of fresh air should lower the temperature to the freezing point no harm will be done, providing the air is admitted at many small openings. Large and few openings, however, tend to produce strong and dangerous drafts. There are a number of methods by which the horse barn may be ventilated, chief of which are the windows, grates and ventilating shafts.

In ventilating tightly ceiled barns, shafts are preferred. While there are many methods of arranging these ventilating shafts, they consist essentially of two parts, the inlets and the outlets. The inlets should be numerous, of small size, and placed on all four sides of the stable in

order to take advantage of the wind, regardless of the direction from which it blows. In this way a large quantity of air is admitted and evenly distributed throughout the stable. A convenient size for these inlets is 4 x 12 inches, as this permits them to be built between two four-inch studding. They should begin near the ground on the outside and end near the ceiling on the inside.

The outlets must be so constructed as to meet three conditions: First, they should remove the stable air from near the stable floor. The refuse gases are heavier than the other air of the stable and remain near the floor, as does the colder air. Second, they should be provided with openings near the ceiling, which can be closed at will, for the removal of the warm air when the stable becomes too warm, particularly in the summer. Third, it is important that these ventilators be so arranged as to afford as little inconvenience as possible, particularly when they extend through the hay loft, where they are sometimes in the way of the hay fork. These outlets should be as large as convenient. The essentials of a good ventilating flue are similar to a good chimney.

Ventilating shafts are expensive, particularly if constructed so as to work properly, for which reason windows are more commonly used for ventilating the horse barn. The windows can be so arranged as to form a good system of ventilation. When so used they should be hinged near the center, allowing the top to open inward. This is important, for if the bottoms open into the stable, the windows are likely to be broken by the animals running against them. By opening windows so arranged a good circulation of air is provided. (Fig. 180.)

Light.—Sunlight is nature's disinfectant. With sufficient light and proper ventilation, germ disease is not likely to occur. Window glass is inexpensive and should be abundantly supplied in the construction of the barn. Best results are obtained by cutting the windows long from top to bottom and by having them extend low, as

more direct sunlight will fall on the floor. This is the chief objection to underground or bank barns for horses. Bank barns are usually dark and damp, and, therefore, objectionable as horse stables. True, windows increase the temperature in the daytime and serve to radiate heat at night, but this is not so important as an abundance of light, particularly for horses. Further, light shows dirt

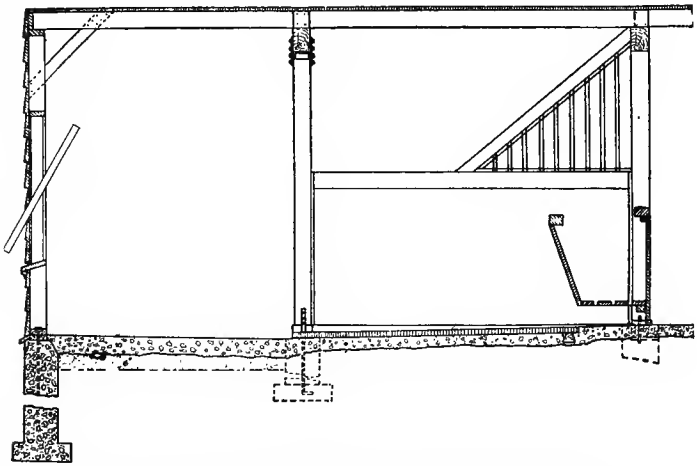

FIG. 180.—CROSS SECTION THROUGH HORSE BARN

Showing partition, manger, concrete floor, covered with plank, and the arrangement of windows.

and makes it easy to keep the barn clean. Dark stables are likely to be dusty, dirty and damp, thus providing conditions for germ growth. In addition to cleanliness, freedom from germ disease, and the like, a barn into which the sun shines freely furnishes a cheerful place in which to work.

Cleanliness.—In the planning of a horse barn, it should be so arranged as to facilitate ease of cleaning. Horse manure being damp and warm decomposes rapidly and the gases thus formed contaminate the stable. In summer this decomposing manure is a favorite breeding place

for flies. Therefore, the stables should be cleaned frequently and a liberal supply of absorbent bedding should be provided to take up the liquids voided. The mangers should be kept clean at all times. They must receive special attention in case corn on the cob is fed, otherwise the cobs will accumulate in the bottom of the mangers, where they form a fertile media for the propagation of germs of all kinds. The ceiling and walls should be cleaned frequently with a cobweb broom to prevent excessive dust and filth accumulation. It is a good plan to have the stable fixtures, walls and ceiling of a light color, as this facilitates both cleaning and lighting.

Convenience.—In the planning and construction of a horse barn due regard should be had for convenience, not only in respect to cleaning the stable and in feeding, but for all other farm work as well. As a rule, the barn is more convenient to the farm when centrally located, but more convenient to the market when located near the highway. In this respect, therefore, the location would depend on the type of farming. Thus if most of the produce was to be sold it would be more convenient near the highway, whereas if the major part of the crops were to be fed it would be more convenient near the center of the farm, as both the crops produced and the resulting manure are nearer the place where needed, thus lessening team work.

As a rule, the horse barn should be planned to hold sufficient food for the animals housed therein. An abundance of loft space can be secured at little additional expense. The barn should be arranged so as to feed the horses with the minimum amount of labor. This can be accomplished more satisfactorily by arranging two rows of stalls, standing the animals with their heads toward the center. A six to eight-foot feeding alley should be arranged through the center and a four to seven-foot lead alley behind the horses along the wall. Such alleys will give ample room for the feed and litter carriers and pro-

vide sufficient space for the harness closets, behind the horses along the wall. Immense barns, however, in which large quantities of grain and hay are stored, and many animals housed may have other objections which offset the advantages of concentration and ease of feeding. The risk of total destruction by fire is great, as are dangers from contagious disease, and the like. Under such conditions perhaps a number of medium-sized, well-regulated barns, located some distance from each other, would prove more economical in the long run.

Box and straight stalls.—There are two types of stalls in common use, the box stall and the straight stall. In planning and constructing horse stalls there are a number of factors to be taken into consideration, chief of which are the comfort and safety of the horse; the economy of barn space; the economy of labor in feeding, cleaning, and the like; the economy of material in the construction of the stall; and facilities for lighting and ventilation. The comfort and safety of the animal is promoted by the use of the box stall. He has more freedom and can assume any position, lying down and getting up with ease. The economy of barn space is favored by the straight stall. The box stall must be at least 10 x 12 feet square, while the straight stall need not be over five feet wide and nine feet long.

The economy of labor is promoted by the straight stall. Not only is the box stall more difficult to keep clean, but the animal requires more grooming to keep him in presentable condition. The feeding and bedding can be more easily accomplished in the straight stall. The straight stall also favors economy in material, as the partitions need not be so high as in the box stall. While box stalls are very comfortable for the horse, yet they are rather difficult to ventilate properly and hinder the general lighting of the barn, particularly in case they are boarded up solid to the ceiling. All things considered, the straight stall is preferable for working horses, al-

though every horse barn should be provided with a few well-lighted and well-ventilated box stalls, as they are indispensable for brood mares, colts and sick animals.

At present it seems to be fashionable to construct low, open stall partitions. This is a serious mistake, as the animals frequently injure themselves by kicking, which the open partition encourages. Occasionally, an animal kicks over the top of the low partition and injures himself permanently, as he is unable to free himself. Stall

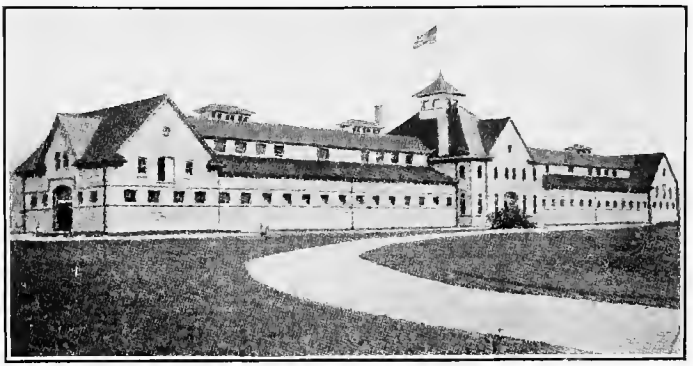

FIG. 181.—TROTTING-HORSE BARN WITH TRACK IN THE FOREGROUND

partitions between straight stalls should be boarded up solid for at least five feet.

Mangers and grain boxes.—The hay should be fed from a manger. The hay rack is objectionable, as the horse pulls the hay out and drops much of it under his feet. The seed and dirt get into his mane, which is difficult to keep clean. The top of the manger should be about three feet high. The bottom should be slightly raised from the floor and should be so constructed that the dirt may sift through, thus preventing its collecting in the bottom of the manger. The manger should slope inward, to prevent the horse from injuring his knees when stamping flies. The hay should neither be thrown from the mow

into the manger nor directly in front of the horse, but into a small room separated by a door from the stable. Neither should the bedding be thrown down in such a manner as to cover the horses and harness with dust.

The grain should be fed from a grain box with a level, broad bottom. Some horses eat their grain too rapidly and a large flat-bottomed box tends to make them eat slowly, and hence to insalivate their food. Metal boxes are preferred to wood, but are too expensive for common use.

The stable fittings, mangers, grain boxes and stall partitions should be constructed of hard wood. Horses love to gnaw pine, and once they get into the habit, no matter what the original cause, they are hard to stop. Further, if the partitions and posts are of soft wood, the horses will splinter them by kicking so that they are very unsightly as well as lacking in endurance. Even if the fixtures are of hard wood it may be necessary to cover them with strap iron to prevent the horse from gnawing and splintering them by kicking, when feeling good, as in the winter. (Fig. 180.)

Harness room or closets.—In constructing a horse barn special provision should be made for the care of harness. Usually the harness is hung just back of the horse in the stable. This is very objectionable, as gases escaping from the manure are very destructive to harness, and it frequently happens that the harness is knocked down under the animal's feet and becomes soiled with manure. To avoid this a harness room convenient to the horses should be provided. If there are a great number of horses housed in the barn it is perhaps more convenient to arrange harness closets just back of the horse along the wall and between the windows. A well-kept harness room or closets is a source of comfort to the owner and increases the usefulness of the harness.

Flooring materials.—The stable floor should be durable, waterproof and cheap. It should be so constructed that the horse will not slip and injure himself in getting

up. Many materials are used in the construction of stable floor, such as clay, brick, cobblestone and cement, although the latter are rather hard on the feet. For box stalls perhaps no other material excels clay, as it is good for the feet. For straight stalls perhaps no other material excels cement, covered with plank in the stall where the horse stands. The cement floor is durable, sanitary and inexpensive. If given a rough finish the horse will not slip, although if heavy loads are to be drawn over the floor, the cement should be creased before it sets. The cement in the wagon room and lead alleys should be six inches thick, although in the stalls, where it is covered with plank, a depth of four inches is sufficient. The floor of the straight stall should slope to the rear at least one inch in eight feet, so that the liquid excrement will drain off quickly. It is a good plan to leave a very shallow but broad gutter just to the rear, along the ends of the plank, to catch this liquid. A very shallow gutter one-half inch deep and six inches broad gives good results. From this shallow gutter the liquid can be absorbed by straw, shavings or any bedding material. It is a good plan to sprinkle daily a little dry earth or gypsum on the floor of the stable where it is damp. (Fig. 180.)

Construction of the walls.—Since the horse does not suffer from a moderately low temperature, it is a comparatively simple matter to construct a horse barn, especially when compared with that of the dairy cow. The walls should not be airtight, as the moisture condenses rapidly and the stable becomes damp and cold. For siding the horse barn, unmatched boards planed on one side are preferred. The boards should be placed vertically and the cracks properly battened. If harness closets are constructed along the wall and between the windows as suggested, it will be necessary only to ceil under and above the windows. This inside covering should consist also of unmatched boards. The outside covering should be given a thorough painting every three years, while the

inside should be whitewashed once every year, as this serves to promote lighting and sanitation.

Roofing materials.—There are a great variety of roofing materials on the market, many of which are scarcely worth the time required to put them on, notwithstanding the fact that they are easily laid. While there is no roofing more durable or satisfactory than slate and tile, yet they are heavy and require strong rafters. All things considered, perhaps a good shingle roof is best. Soaking wooden shingles for a moment in boiling linseed oil adds to their durability. A trifle of red color added to the oil, just enough to stain, improves the appearance of the roof. Dip the shingles in large handfuls to the tips, lay them on a piece of sheet iron and let them drain back into the kettle. For shingles the roof should be fairly steep. Dipped shingles on a steep roof will last a lifetime. Metal, rubber and paper are often used for roofing barns, but, as a rule, give poor satisfaction.

FIG. 182.—LITTER CARRIER IN USE

Labor-saving appliances.—In constructing a barn it is important to install all of the adaptable labor-saving appliances available. The framework and the rafters should be of sufficient strength to carry a hay fork to facilitate mowing the hay. In large barns the alley ways should be

of sufficient width to permit the use of both feed and litter carriers. While these carriers may be of little advantage in small barns, they are practically indispensable in large ones. Grain, hay and straw chutes should be arranged wherever they can be used to advantage. To facilitate watering the horse there are several watering devices upon the market, some of which are so arranged that there is a constant supply of water before the animal at all times. When these vessels can be kept clean and free from odor the practice seems a good one. In many instances, however, these watering devices are traps of filth and foul-smelling water. Perhaps a better plan is to use large troughs that can be cleaned frequently.

Care of manures.—The voidings, including the necessary bedding, will reach six to eight tons per horse per year. On the basis of the fertilizing ingredients this manure is worth from $10 to $20 a year. It is, therefore, of importance that the manure from the horse stable be carefully husbanded. If convenient, a separate small building should be constructed for temporary storage. If horse manure is unmixed with that of cows, it should be thoroughly wet from time to time. Some salt may be used on the manure, a quart to a load. This will retard heating and discourage the flies from breeding in the manure. If convenient, swine may be allowed to roam over the manure, as this aids in solidifying it and the swine will find some food in the voidings.

Paddocks for breeding stock.—In planning the horse barn a few paddocks, or still better, small fields should be provided for near the barn. These lots should be of sufficient size to allow some pasturage. As a rule, these paddocks are so small that the grass is destroyed by the tramping of the animals. A few small grassy paddocks near the barn are very convenient in separating pregnant mares or foals and dams from other horse stock. Such paddocks afford ideal runs for young foals while the dams are at work.

CHAPTER XLI

COMMON AILMENTS OF THE HORSE

When properly cared for the horse is the most healthful of our farm animals. He is thought to be a native of the north and can endure adverse conditions so long as given his freedom. His troubles begin, however, when he is closely confined, improperly fed or watered, and overworked. Under such conditions the horse is subject to a very large number of ailments, some of which are simple and easily cared for, more of which are complicated and require skilled treatment. This chapter simply directs attention to the more common ones and how to avoid them rather than to suggest treatment. Everyone who owns a horse should know how to care for the simpler difficulties, and when to call for the advice of a veterinarian.

Nursing a sick horse.—The sick horse should receive careful attention. In many of the lesser ailments good care is preferred to the use of medicine, while in many others rest is preferred to both. Thus, in the case of the horse that is run down in flesh, appetite gone, and otherwise out of condition, comparative idleness is essential. Under such conditions there is nothing better than a good blue grass pasture, well watered and well shaded, especially in the early summer, before the flies become troublesome. The aim is to hasten recovery from the ill effects of the ailments. To do this we must understand the horse thoroughly and be able to supply his every need. This calls for careful, painstaking and patient effort. First of all look for the cause of the trouble, and, if possible, remove it. If the disease is contagious, the sick horse should be separated from the others and placed in well-ventilated and comfortable quarters.

Feeding the sick horse.—As the appetite is usually poor and sometimes lacking, much care should be exercised in feeding the sick horse. The food should be attractive, nutritious and readily digestible. It should not contain much bulk and should be rather laxative. Natural foods, such as fresh grass, carrots and warm bran mash, are to be preferred to prepared foods, though the use of patent stock food may prove beneficial when a tonic is valuable.

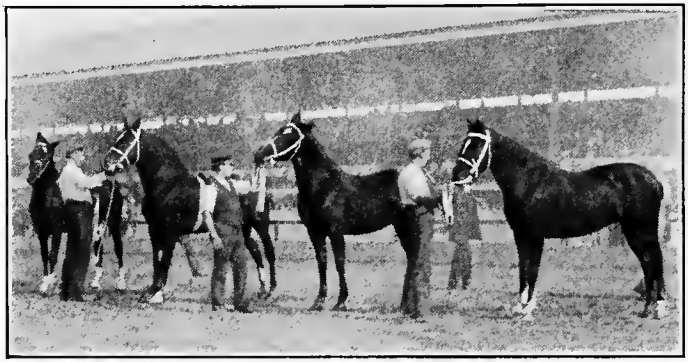

FIG. 183.—HACKNEY BROOD MARES

In case the animal refuses the food it should be removed from sight, and under no condition left in the feed box until the next meal. Do not place medicine in either the food or water if it can possibly be prevented, as the horse is likely to refuse the food just at a time when it is important that he should have it.

Giving medicine.—Medicine should be given only for a definite purpose, otherwise more ill will result than good. As a rule, too much medicine is given the sick horse. Nature should be given a chance. Medicine of itself is worth little except as it gives the system tone, thereby enabling it to overcome the disease. If a horse is out of condition the remedies administered should be those of known value and proven worth. While there are many

methods of giving medicine, the more common and simple are by drenching, external application, enemas or injections into the rectum, blistering and firing.

Drenching.—Dissolve the medicine in water, using just enough water to thoroughly dissolve the medicine, as more makes the drench bulky. Shake the drench immediately before administering. Slightly elevate the horse's head and gradually pour the drench into the corner of his mouth. To prevent him from strangling give him the freedom of his head a few times while administering the drench, and do not elevate the head too high.

External applications.—Medicine is frequently given by applying it to the skin in the form of baths, liniments, ointments, salves, poultices, and the like. Bathing the parts in hot or cold water often proves very beneficial. It is much used and with good results in lessening pain, inflammation and swelling in recent injuries. Liniment is a thin, liquid solution of a medicinal substance, and is used to relieve pain and inflammation as well as to produce local stimulation. It should never be applied to fresh wounds or sores. Ointment is a waxy material consisting of medicines mixed with fats, and is used to soften, soothe and heal inflamed parts. A poultice is a soft, moist substance used to soften, soothe and relieve severe inflammation. It should be changed frequently. There are many substances used in making poultices, chief of which are flaxseed meal, bran, bread and milk, and mashed boiled turnips. Whatever the substance, it should be clean, soft and capable of retaining heat and moisture. To keep it clean and sweet, add a teaspoonful of carbolic acid to a quart of poultice.

Blisters.—These are counter-irritants to be used in chronic or long-continued ailments. There are two kinds in common use, the "fly blister," made from cantharides, and the "red blister," made from biniodide of mercury. Both are poisonous, and their application requires skill and experience. They are made by mixing one part by

weight of the drug to eight parts of lard or vaseline. For most uses the fly is preferred, but in removing bunches the red is most used. First clip the hair from the area, then rub on blister from three to ten minutes, depending on severeness of irritation and the thickness of the skin. A light blister repeated is preferred to a severe one. Care should be taken to see that the horse does not scratch the blister. After 24 to 36 hours, or when a watery, gummy fluid exudes from the skin, the area should be thoroughly washed with warm water and soap, then wiped dry and greased with fresh lard or vaseline. When large areas are to be blistered, as in pleurisy, inflammation of the lungs, and the like, a mustard plaster should be used, as fly blisters irritate the kidneys.

Firing.—This is also a counter-irritant, useful in removing bunches, ringbones, spavins, and the like. The application requires skill and experience. The hair is clipped from the area, the horse blinded, a twitch applied to the nose, and the opposite foot lifted, and then the hot irons are applied to the area. At first the skin is barely touched and the lines marked and then the lines are burned to a good russet brown. A fly blister is then rubbed on the fired area and the case treated as for blistering. The horse should be given plenty of time to recover.

Enemas or injections.—Medicine is often given by injections into the rectum when it cannot be given by the mouth, and when it is desired to stimulate the bowels to action. Food may also be given in this way. Injections are best given by means of a rubber hose about four feet long, to which a funnel is attached. Oil the hose and gently insert it into the rectum about two feet, then pour the liquid into the funnel and by raising it above the horse the liquid will force itself into the bowels. Six to eight quarts of warm water is sufficient for the adult horse, and if to this is added a half teacupful of pure glycerine, much better results will be obtained.

Indigestion.—This is one of the most common ailments of the horse. It is brought about by feeding indigestible food, improper feeding, hard work immediately after feeding or watering, and any cause that profoundly disturbs the system. It may occur in either mild or acute form. In mild attacks the animal refuses his food, lies down and

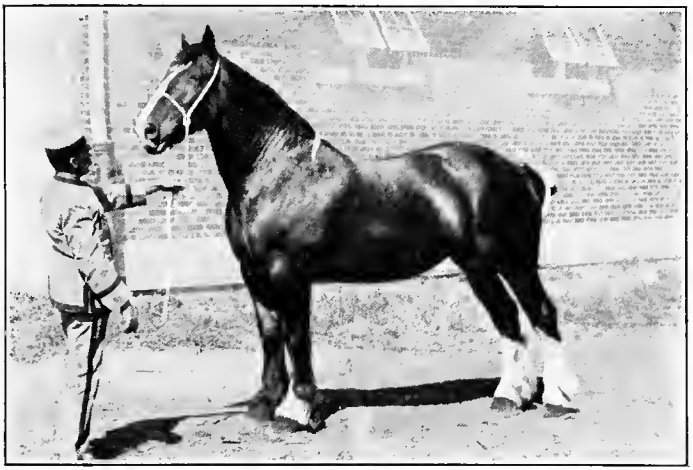

FIG. 184.—SHIRE MARE "WYDERLANDS SUNSHINE"

immediately gets up, looks toward his flanks, and often paws the ground. In such cases but little treatment is necessary. Feed a light laxative diet such as bran mash and fresh grass, and allow the digestive system to rest a few days. Two-ounce dose of Jamaica ginger in a pint of moderately hot water, given as a drench three times daily, is excellent.

In acute cases the causes and symptoms are similar, but the pain more severe. The horse may stand stretched out and strain, as if trying to pass urine, then lie down and get up, look at the flanks and paw as before. The care and treatment is the same as in mild cases,

except that the ginger drench may be repeated every three hours.

Colic.—This term is loosely applied to almost all digestive troubles that are accompanied by pain. There are two forms, spasmodic or cramp colic, and flatulent or wind colic. Cramp colic is a violent and painful contraction of the muscular coats of the bowels. It is caused by some irritant in the intestines, such as undigested food, large amounts of cold water when the horse is tired or warm, sudden changes in the food, and like causes. The pain is severe and often comes on suddenly, the animal sweats and the respiration and pulse increase rapidly. He looks toward his flanks, stretches and strains, paws, kicks his belly, throws himself down, and rolls. Soon the pain passes, only to return in a few minutes.

Get the horse into a comfortable place where he can roll without injury. Inject into the rectum eight quarts of warm water, containing half a teacupful of glycerine. This should be done slowly, so as to allow the horse to retain it as long as possible. Drench with two-ounce doses of Jamaica ginger. Sweet spirits of niter in ounce doses is good, as is a tablespoonful of common baking soda. Blankets wrung out of hot water and applied to the belly relieve the pain, as does also rubbing the belly vigorously. In wind colic the causes and symptoms are the same, except that the pain comes on more gradually and is continuous. There is an accumulation of gas, resulting from the fermenting food. The treatment is much the same as suggested in cramp colic.

In all bowel trouble the cause is usually due to an irritant, which should be located and removed. It is usually a good plan to give a physic. For this purpose a quart of raw linseed oil is best, but should be given with great care, as there is danger in choking the horse. The giving of oil requires skill and experience.

Worms.—Horses of all ages are more or less subject to troubles caused by intestinal worms, especially when thin

in flesh and otherwise out of condition. Thus the horse that is liable to attack should be kept in a vigorous and thrifty condition. In many cases affected horses that are given a good variety and an abundance of nutritious, laxative food, with some tonic, recover their normal condition. Turpentine in two-ounce doses, is an excellent remedy. The turpentine should always be well diluted, either with milk, olive oil or raw linseed, so that it will not blister the mouth or throat. These doses should be given once daily for two or three days, and followed by a good physic, as a quart of linseed oil, which should be given with care.

Azoturia.—This is an ailment resulting from high feeding and lack of exercise. It is known by a variety of names, as lumbago, black water and holiday disease, so called because of its occurrence after the horse has stood idle a day or longer without usual work or exercise. It often comes on quickly, attacking the horse after traveling only a short distance. He becomes stiff, particularly in the hindquarters, and sweats profusely. The muscles tremble, the hind parts become difficult to control and the animal goes down and is often unable to rise again. The treatment in mild cases is a laxative and daily exercise. In sudden attacks friction of the limbs is good. Blankets wrung from hot water and placed over the loins and hips assist the circulation. Rubbing the affected muscles with iodine often relieves the tension. Purgatives are also of value. The horse should have free access to water.

Distemper.—This ailment is known by a variety of names, chief of which are strangles, colt ill, catarrhal fever and shipping fever. It appears as a fever lasting a few days, with formation of matter or pus in the air tubes, and often the formation of abscesses under the jaw. At the end of a couple of days a cough is heard and the discharge comes from the nostrils. The disease passes from one animal to another, and there are few that escape it when once exposed. Light cases require little treatment

beyond proper protection from damp and cold, and the feeding of nutritious, easily digested food, such as bran mash and fresh grass. If more serious a simple way of reducing the temperature is to inject cold water into the rectum. To ease the cough and allay the inflammation of the mucous membrane, place a blanket over the head, and steam with the vapor of warm water poured over a bucket of bran and hay in which belladonna, camphor gum or tar has been placed. If the bowels are constipated give an injection of warm water and glycerine. If an abscess forms, poultice with warm linseed, changing daily, and after the abscess breaks wash with three per cent solution of carbolic acid.

Influenza.—This disease is known by a variety of names, such as pink eye, bilious fever, grippe, and the like. It appears as a rapidly developing fever, which becomes intense within a very short period. The horse seems greatly depressed, standing with his head down, but not back on the halter, as in lung disease. There is sneezing and a troublesome cough. The mucous membranes of the eyes are very frequently enlarged and inflamed, giving rise to the name pink eye. The disease passes rapidly from one horse to another, although one attack often protects the animal from another, but not always.

The treatment is to give rest, provide well-ventilated, well-lighted and comfortable quarters and feed easily digested and nutritious foods, such as bran mash, good oats, clean hay, roots and fresh grass in season. The horse must have protection and warmth or complications will develop. To reduce the fever inject cold water as suggested in distemper. To ease the cough and allay the inflammation of the mucous membrane, steam the head, as suggested in distemper, using a piece of camphor gum about the size of a walnut, and holding the horse's head over the pail for fifteen minutes at least three times daily. If the bowels are constipated give an injection of warm water and glycerine. If the throat is sore, rub on

a little mustard once a day for a few days. Care must be taken to avoid complications.

Sweeney shoulder.—This is a rapid wasting away of the muscles on the outside of the shoulder blade. While occasionally seen in horses of any age, it is more common in young animals. It is caused by straining, severe pulling and jerking movements, such as in plowing stony land. Idle horses when put to work are most subject to the ailment. The nerves or blood vessels of the affected part seem to be injured by the pressure of the collar. The treatment is to remove the cause and give the horse rest. The skin over the affected muscles should be loosened from the tissue beneath by manipulation. Rub the skin and muscles. Later, apply a mild liniment and failing in this try a mild blister. At least two months should be allowed for a complete recovery. In case there is a wasting of the muscles of the shoulder, with severe lameness, the cause should be sought in the foot. When the cause of the lameness is located and removed the muscles will resume their normal condition.

Sore shoulder and neck.—Hard-working horses are frequently troubled with sore shoulders and neck. This is largely due to poorly fitting collars and certain kinds of work especially when the load borne by the neck is great. The treatment is to remove the cause. If nothing else is at hand wash the parts with cold salt water and when dry dust with finely pulverized, air-slaked lime. Oxide of zinc ointment is good. This is made by mixing one ounce of oxide of zinc with four ounces of benzoated lard. If the parts become callused, apply a dull red blister, which will absorb the callus. It will be necessary to rest the horse while applying the blister.

Foul sheath in geldings.—This is an accumulation of material from the glands of the sheath which often hinders the free passage of urine. The sheath may become stopped up and the retained urine increase the trouble. In such cases the sheath should be well cleaned with

warm water and soap and then greased with fresh lard or vaseline.

Mud fever.—This is an inflammation of the skin of the legs. It is caused by the irritation of mud and water in

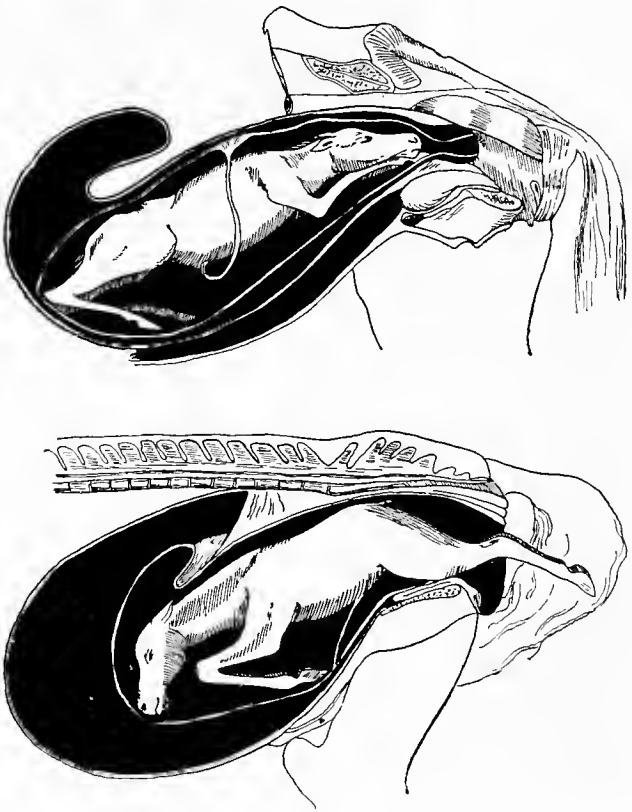

FIG. 185.—NATURAL PRESENTATION OF YOUNG

the spring of the year. In geldings it is often caused by spattering urine against the fore legs. The treatment is to keep the parts clean. Clip the hair, cleanse the parts

by washing with warm water and tar soap, wipe dry, and then rub with vaseline.

Scratches.—This is an inflammation of the skin in the region of the heel, and is commonly called "grease heel." It is due to mud and filth, and is more common on the hind legs because of the exposure to the manure. The treatment is to cleanse the parts by clipping the hair and bathing in warm water and tar soap. Then apply a warm poultice of scalded bran or linseed meal, changing twice in 24 hours. After the scabs are removed, thoroughly cleanse the parts, wipe dry, and apply an antiseptic, as boric acid, dusting into the sores and then cover with some oily dressing, as vaseline.

Cracked hoofs.—These are of common occurrence in the horse. They may be due to severe work, to dry weak hoofs, and to injuries at the hoof head. When the cracks extend from the top of the hoof they may cause severe lameness. The treatment is to cleanse the crack, washing with a five per cent solution of carbolic acid. The crack should be drawn together with shoe nails or clips made especially for the purpose. Keep the hoof clean and well oiled.

Difficult parturition.—Occasionally the mare experiences difficulty at parturition time. If presentation is abnormal the fetal membranes may be disconnected and result in injury to the young. If the mare is in trouble and examination shows the young to be in any other position than natural at once call for the advice of a veterinarian. (Fig. 185.)

CHAPTER XLII

STALLION LAWS AND REGULATIONS

While the American horse breeders have produced the fastest trotting and pacing horses in the world, little progress has been made in the draft horse breeding industry. This lack of progress is due, in part at least, to the indifference of breeders in choosing stallions for service, preferring to take their mares to a grade stallion, rather than pay a little higher service fee, or go a greater distance in order to secure the service of a pure-bred stallion of merit. The necessity of some move that will bring about an improvement in the quality of the horses raised on our farms has been realized for some time. Without doubt, France and Belgium, the leading draft horse producing countries of Europe, owe their reputation to the government regulation of stallions offered for public service. This served as a stimulation, and in recent years many of our own states have enacted laws regulating the public service of stallions and jacks, with the hope of raising the general standard of the horse and mule-breeding industry.

State stallion laws.—The first state law to regulate the standing of stallions and jacks for public service was that of Wisconsin, which went into effect January, 1906. Since then many other states have enacted similar laws. Although each of these laws varies more or less in detail, they have for their chief aims, first, the barring of all stallions and jacks from standing for public service which are affected with any unsoundness or infectious disease; and, second, the providing of a means whereby the public may be able to know for a certainty whether the animals are pure bred or grades. It is claimed that such regulations serve as a protection to many, as the average

breeder is unable to recognize all the unsoundnesses and infectious diseases, or to obtain accurate information concerning the breeding of a stallion or jack, unless he has had considerable experience in horse and mule breeding.

The chief points of difference in these laws as enacted are, first, the methods of inspecting stallions or jacks before being accepted for public service; and, second, the manner in which they are disqualified from standing for public service. In some states, as Wisconsin, the owner must make oath before a notary public or other authorized officer that the stallion or jack is, to the best of his knowledge, free from hereditary, contagious or transmissible unsoundness and disease; while in other states, as New Jersey, the stallion or jack must be examined by a qualified veterinarian appointed by the stallion registration board in charge of the work. In some states, as Wisconsin, stallions or jacks affected with certain unsoundnesses and diseases are disqualified from public service; while in other states, as Kansas, no stallion or jack is barred from public service, but they must be advertised for just what they are, whether pure bred, grade or cross bred, and whether sound or otherwise. In some states, as Nebraska, stallions and jacks are divided into three classes, pure bred, cross bred and grade; while in other states, as Wisconsin, they are divided into a number of classes, as pure bred, cross bred, grade, nonstandard bred, and mongrel or scrub.

Soundness as a qualification.—There is a rather strong feeling among stallion registration board officials that stallions and jacks should not be disqualified from public service because of unsoundness alone, particularly when the animal in question is known to be a good sire. Perhaps conformation is as important as soundness. In many states any kind of a sound stallion or jack is qualified for public service, even though of notably poor conformation and of unknown breeding. It is difficult to convince the average farmer that a stallion possessed of

the best breeding, and a sire of good colts, is unfit for service, due to the presence of a slight unsoundness, as defined by law, while a nearby stallion, being free from any of the unsoundnesses mentioned by law, possessing notable defects, as well as of unknown breeding and the sire of many undesirable colts, is worthy of public patronage. Nevertheless, in many states stallions and jacks are disqualified from public service for certain unsoundnesses

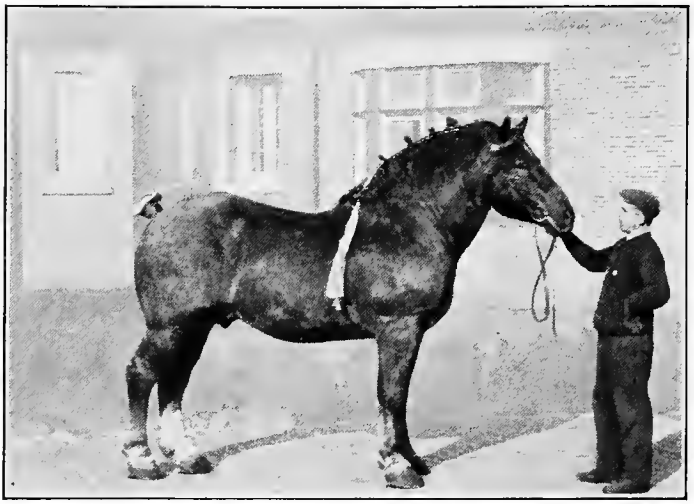

FIG. 186.—BELGIAN STALLION "FRANK BRISER"

irrespective of the breeding and reputation as breeders.

While the unsoundnesses that disqualify a stallion or jack from public service vary somewhat in the different states, yet many of them are similar to the Wisconsin law, which is as follows:

Diseases that disqualify a stallion or jack from public service:

"Cataract; amaurosis (glass eye); periodic ophthalmia (moon blindness).

"Laryngeal hemiplegia (roaring or whistling).

"Pulmonary emphysema (heaves, broken wind).

"Chorea (St. Vitus dance, crampiness, shivering, string halt).

"Bone spavin; ringbone; sidebone; navicular disease.

"Bog spavin; curb, with curby formation of hock.

"Glanders, farcy; maladie du coit; urethral gleet; mange; melanosis."

It is interesting to note the relative frequency of the various classes of unsoundness in draft and light horses. In Minnesota the common causes of disqualification for draft horses are sidebones, which are by far the more common, bone spavin, roaring, ringbone and cataract in the order named, while in light horses bone spavin, ringbone and sidebone occurs in the order named. This is illustrated in the following table, which shows the cause for which stallions were disqualified from standing for public service in Minnesota:*

Disqualification	Draft horses 4135 examined 115 disqualified			Light horses 930 examined 13 disqualified		
	Pure-bred	Grade	Total	Pure-bred	Grade	Total
Sidebone	31	32	63	0	2	2
Bone spavin	2	15	17	2	3	5
Roaring	7	7	14	1	0	1
Ringbone	0	4	4	2	2	4
Cataract	2	1	3			
Ophthalmia	2	1	3			
Curb	0	1	1			
Spavin and roaring	0	2	2			
Sidebone and roaring	3	1	4			
Sidebone and ring-bone	1	0	1			
Sidebone and spavin	1	0	1			
Spavin, ring-bone and curb	0	1	1			
Sidebone and Amaurosis	1	0	1			
Roaring and stringhalt				0	1	1

According to this table over 50% of the stallions disqualified from standing for public service in Minnesota are troubled with sidebones.

* Bulletin No. 3. A Report of the Horse-Breeding Industry in Minnesota.

Breeding of stallions that qualify.—The number of horses of each breed that qualify for public service gives an idea of the relative importance of the various breeds. By choosing a few states at random the Percheron is seen to be the favorite draft horse. In the four states selected, namely, Wisconsin, Minnesota, Pennsylvania and North Dakota, there were two and one-half times as many Percherons qualified for public service as all other draft breeds combined. There are approximately the same number of Belgians and Clydesdales as well as of Shires and French Draft horses. After the Percherons the next most popular breed is seen to be the Standardbred, which includes the American trotters and pacers.

NUMBER OF PURE-BRED HORSES THAT QUALIFIED FOR PUBLIC SERVICE THE FIRST YEAR THE REGULATIONS WENT INTO EFFECT IN THE STATES MENTIONED.

Breed	Wisconsin	Minnesota	Pennsylvania	North Dakota
Percheron	455	568	231	614
French Draft	37	63	24	61
Belgian	50	110	34	62
Clydesdale	66	65	21	93
English Shire	39	41	30	53
Suffolk Punch	3	2	0	3
Hackney	10	5	23	3
French Coach	54	18	19	5
German Coach	39	25	23	7
Cleveland Bay	4	5	3	0
Yorkshire	0	0	1	0
Standardbred	275	135	211	96
American Saddler	3	0	5	1
Thoroughbred	2	0	5	0
Morgan	11	10	15	2
Orloff	0	0	1	0
Shetland	2	2	2	1
Jack	5	0	0	6

National Association of Stallion Registration Boards.—As has been stated, there is more or less difference between the stallion laws of the various states. The necessity of some move that would harmonize these laws has been realized almost from the beginning. Thus, in August, 1910, to meet this apparent necessity, an associa-

tion was formed, to be known as the National Association of Stallion Registration Boards. The chief purpose of this association is to harmonize the efforts of the various state boards and to encourage the passing of similar laws in other states in order that the legislation may be more widespread. This association has adopted recommendations embodying the essential principles to be observed in the adoption or amendment of state stallion laws, and the list of stud books to be recognized in determining a pure-bred animal (Table I of the Appendix).

The result of state stallion laws.—"As a result of the public advertising of licensed stallions, required by the law, which has been in force in Wisconsin since January 1, 1906, it may be safely asserted that owners of mares are more than ever before patronizing pure-bred stallions, while grade and mongrel or scrub stallions are becoming less popular. Progress in the improvement of our horses is, however, greatly retarded by the indifference of many owners of mares who persist in using grade and scrub sires for the insufficient reason that the service fees of such horses are comparatively cheap. Such practice is poor business policy. The cheap sire means cheap progeny and loss of profits at selling time. The higher fee of the pure-bred sire is returned tenfold or more when the colt is sold; or if retained for work, the colt proves of greater practical value than his base begot mongrel rival. It is deplorable, too, that year after year men persist in licensing grade and scrub stallions. It is noticeable, however, that most of the new licenses go to new owners. Presumably, these are not aware of the state-wide effort being made toward the improvement of our horses. They have still to be educated to understand that by offering a grade or scrub stallion for public service they are working against the best interests of their neighbors and retarding the progress of state horse breeding. Their work also invites criticism from interested people throughout the country who are looking to

Wisconsin to quickly rid herself by education of the large number of undesirable stallions now patronized by many unthinking farmers."*

The effect of the laws has been to increase the number of pure-bred stallions and jacks offered for public service. Few people realized that so large a proportion of the stallions and jacks standing for public service in this country were grades until figures were obtained as the result of the enforcement of the state stallion laws. Since it is difficult for a grade to compete with a pure bred, when the fact is published, the grade sire is rapidly disappearing in those states where stallion laws are effective. This is clearly illustrated in the following table:

TABLE SHOWING THE PER CENT INCREASE OF PURE AND THE PER CENT DECREASE OF GRADES FOR WISCONSIN AND PENNSYLVANIA SINCE THE STALLION LAWS BECOME OPERATIVE

	Wisconsin		Pennsylvania	
Year	Pure-bred	Grade	Pure-bred	Grade
1906.....	40%	60%		
1907.....	35%	65%		
1908.....	40%	60%	33%	67%
1909.....	42%	58%	37%	63%
1910.....	47%	53%	38%	62%
1911.....	52%	48%	39%	61%
1912.....	46%	54%	41%	59%

Inspection and quarantine for horses, mules and asses.† —"All horses imported into the United States from any part of the world except North America shall be required to pass a veterinary inspection at the port of entry by an inspector of the Bureau of Animal Industry. Such inspector shall not allow the landing of any hay, straw, or forage which accompanies shipments of horses from any

*Circular No. 28. The University of Wisconsin, Agricultural Experiment Station.
†United States Department of Agriculture. Bureau of Animal Industry. Order 180.

country on the continent of Europe until it has been disinfected as the inspector may prescribe. In case the inspector finds horses affected with any contagious disease he shall isolate them and immediately report the fact to the chief of the Bureau of Animal Industry, who may refuse to allow the landing of horses so diseased. When horses

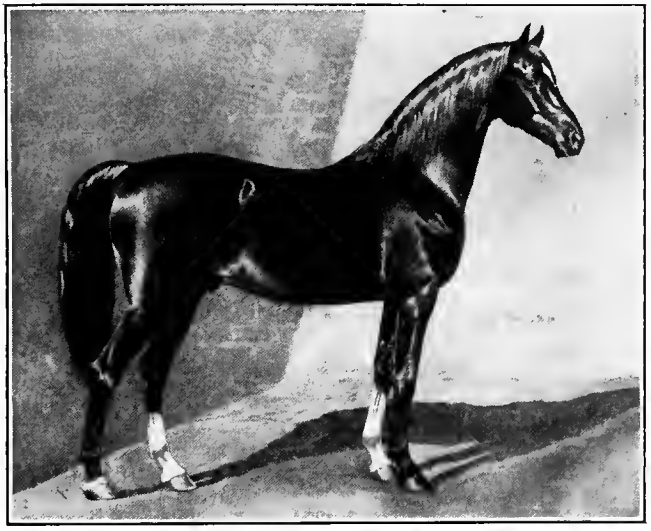

FIG. 187.—ARABIAN STALLION "KHALED"

imported from a country of Continental Europe from which hay is permitted, arrive in a healthy condition and no diseased condition is discoverable, the hay, straw and other forage from such country may remain on board the steamer and be returned. This forage may be used without disinfection in the feeding of animals exported on the same ship, provided it is accompanied by a certificate issued by the proper government officer of such country, as required by the regulations of this department for the importation of hay and straw from Continental Europe, and that there are no indications that it is in-

fected; but if the forage is found to be infected the fact must be reported to the chief of the Bureau of Animal Industry, who will direct the disposition to be made thereof."

Canada.—"Horses for breeding, racing, show and sale purposes, for grazing or for work, shall be inspected at the port of entry, and when so ordered by the chief of the Bureau of Animal Industry must be accompanied by a satisfactory certificate of mallein test signed by an official Canadian veterinarian or by an inspector of the Bureau of Animal Industry. Those belonging to Indian tribes and settlers or immigrants, and those used in connection with stock raising (cow ponies) or mining, and those for temporary stay at points along the frontier not exceeding two weeks, whether for pleasure, driving, or teaming, shall be required to pass a veterinary inspection at the port of entry by an inspector of the Bureau of Animal Industry; or they may be admitted without inspection upon written permission from the secretary of agriculture first had and obtained. Provided, however, that neither inspection by an inspector of the Bureau of Animal Industry nor written permission from the secretary of agriculture shall be required for Canadian horses for pleasure, driving, or teaming, whether driven or ridden into the United States for a temporary stay not to exceed three days. The same rule will apply to American horses returning to the United States from Canada after a stay in Canada not to exceed three days. Horses admitted in bond for export from the United States shall be subject to inspection at any point at which this department has inspectors stationed."

Mexico.—"All horses infested with ticks are prohibited from entering the United States from the Republic of Mexico, when destined to an area in the United States from which cattle are excluded by the federal, state, or territorial authorities on account of ticks, unless and until such tick-infested horses are first dipped or otherwise

treated as hereafter specified in this regulation. . . . However, if horses intended for importation into the United States are held for six months immediately preceding the date they are offered for importation, on premises known to be free from ticks, they may be admitted for any destination without dipping," etc.

Disposal of diseased animals.—"Whenever any animal on arriving at the port of entry or in the quarantine station (healthy horses are not quarantined) is found to be affected with a contagious disease or to have been exposed to such disease, said animal and all animals that have been in contact with or exposed to said animal shall either be refused landing or placed in special quarantine. All such animals found to be so diseased or exposed, either on arrival at port of entry or after being placed in quarantine, shall be at once reported to the inspector to the Chief of the Bureau of Animal Industry, who will direct whether or not said animal or animals shall be landed and quarantined, and as to whether or not said animal or animals shall be appraised and slaughtered, as provided by section 8 of the act approved August 30, 1890."

APPENDIX

APPENDIX

TABLE I

HORSE BREEDERS' ASSOCIATIONS

TABULATION SHOWING THE NAMES OF THE VARIOUS BREEDS OF HORSES, THE NAME OF THE SOCIETY PROMOTING THE BREED AND THE NAME AND ADDRESS OF THE SECRETARY IN CHARGE.

Breed	Registered by	Secretary	Address
Percheron.....	Percheron Society of America	W. Dinsmore	Union Stock Yards, Chicago, Ill.
French Draft.....	National French Draft Horse Association	C. E. Stubbs	Fairfield, Iowa
Clydesdale.....	American Clydesdale Association	R. B. Ogilvie	Union Stock Yards, Chicago, Ill.
Shire.....	American Shire Horse Association	Charles Burgess	Winona, Ill.
Belgian.....	American Association of Importers and Breeders of Belgian Draft Horses	J. D. Connor, Jr.	Wabash, Ind.
Suffolk.....	American Suffolk Horse Association	A. Galbraith	Janesville, Wis.
Hackney.....	American Hackney Horse Society	Gurney C. Gwe	308 West 97th St. New York
French Coach....	French Coach Horse Society of America	Duncan E. Willett	Oak Park, Ill.

TABLE I—*Continued*

Breed	Registered by	Secretary	Address
German Coach...	German Hanoverian and Oldenburg Coach Horse Association of America	J. Crouch	Lafayette, Ind.
Cleveland Bay....	Cleveland Bay Society of America	R. P. Stericker	Oconomowoc, Wis.
American Standardbred....	American Trotting Register Association	W. H. Knight	355 Dearborn St., Chicago, Ill.
Morgan*.....	American Morgan Register Association	T. E. Boyce	Middlebury, Vt.
Thoroughbred....	The Jockey Club	W. H. Rowe	Fifth Ave. and 64th St., New York
Arabian.....	Arabian Horse Club of America	Henry W. Bush-Brown	Newburgh, N. Y.
American Saddler	American Saddle Horse Breeder Association	J. N. Ball	Louisville, Ky.
Shetland Pony ...	American Shetland Pony Club	Miss Julia M. Wade	Lafayette, Ind.
Welsh Pony.....	Welsh Pony and Cob Society of America	J. Alexander	Aurora, Ill.

* Sometimes considered merely as a family of the American Standardbred.

TABLE II

STATISTICS OF HORSES AND MULES*

NUMBER OF HORSES, MULES AND ASSES ON FARMS AND NOT ON FARMS FOR THE UNITED STATES; ALSO APPROXIMATE NUMBER BY CONTINENTS

Country	Horses	Mules	Asses
United States:			
On farms.....	20,509,000	4,362,000	105,698
Not on farms.....	3,182,789	270,371	16,502

* Agricultural Yearbook 1911.

TABLE II—*Continued*

Country	Horses	Mules	Asses
Total North America	27,873,248	5,076,513	436,122
Total South America	9,155,425	893,019	608,397
Total Europe	43,502,876	1,810,365	3,011,349
Total Asia	15,082,239	113,643	4,162,310
Total Africa	1,035,964	318,368	666,180
Total Oceania, including Australia	2,577,203	416	1,858
Grand Total	99,226,955	8,212,324	8,886,216

TABLE III

NUMBER AND FARM VALUE OF HORSES AND MULES ON FARMS IN THE UNITED STATES, 1870-1912, BY FIVE-YEAR PERIODS.

Jan. 1	Horses			Mules		
	Number	Price per head Jan. 1	Farm value Jan. 1	Number	Price per head Jan. 1	Farm value Jan. 1
1870..	8,249,000	$ 67.43	$556,251,000	$1,180,000	$ 90.42	$106,654,000
1875..	9,504,000	61.10	580,708,000	1,394,000	71.89	100,197,000
1880..	11,202,000	54.75	613,297,000	1,730,000	61.26	105,948,000
1885..	11,565,000	73.70	852,283,000	1,973,000	82.38	162,497,000
1890..	14,214,000	68.64	978,517,000	2,331,000	78.25	182,394,000
1895..	15,893,000	36.29	576,731,000	2,333,000	47.55	110,928,000
1900..	13,538,000	44.61	603,969,000	2,086,000	53.55	111,717,000
1905..	17,058,000	70.37	1,200,310,000	2,889,000	87.18	251,840,000
1910..	21,040,000	108.19	2,276,363,000	4,123,000	119.84	494,095,000
1912..	20,509,000	105.94	2,172,694,000	4,362,000	120.51	525,657,000

TABLE IV

IMPORTS, EXPORTS AND AVERAGE PRICES OF HORSES AND MULES, 1892-1911, BY FIVE-YEAR PERIODS

Year ending June 30	Imports of horses			Exports of horses			Exports of mules		
	Number	Value	Average import price	Number	Value	Average export price	Number	Value	Average export price
1892	14,074	$2,455,868	$174.50	3,226	$ 611,188	$189.46	1,965	$ 238,591	$121.42
1897	6,998	464,808	66.42	39,532	4,769,265	120.64	7,473	545,331	72.97
1902	4,832	1,577,234	326.41	103,020	10,048,046	97.53	27,586	2,692,298	97.60
1907	6,080	1,978,105	325.35	33,882	4,359,957	131.99	6,781	850,901	125.48
1911	9,593	2,692,074	280.63	25,145	3,845,253	152.92	6,585	1,070,051	162.50

TABLE V

Number, Average Price and Farm Value of Horses and Mules on Farms in the United States January 1, 1912.

State	Horses			Mules		
	Number Jan. 1	Average price per head Jan. 1	Farm value Jan. 1	Number Jan. 1	Average price per head Jan. 1	Farm value Jan. 1
Maine	109,000	$127.00	$13,843,000			
New Hampshire	46,000	126.00	5,796,000			
Vermont	84,000	121.00	10,164,000			
Massachusetts	64,000	144.00	9,216,000			
Rhode Island	10,000	150.00	1,500,000			
Connecticut	47,000	131.00	6,157,000			
New York	609,000	133.00	80,997,000	4,000	$150.00	$660.000
New Jersey	91,000	143.00	13,013,000	4,000	160.00	640,000
Pennsylvania	572,000	130.00	74,360.000	44,000	147.00	6,468,000
Delaware	34,000	108.00	3,672,000	6,000	133.00	798,000
Maryland	163,000	112.00	18,256,000	23,000	136.00	3,220,000
Virginia	340,000	109.00	37,060,000	61,000	126.00	7,686,000
West Virginia	182,000	113.00	20,566,000	12,000	122.00	1,464,000
North Carolina	173,000	126.00	21,798,000	182,000	146.00	25,988,000
South Carolina	82,000	135.00	11,070,000	166,000	165.00	27,390,000
Georgia	124,000	132.00	16,368,000	310,000	158.00	48,980,000
Florida	52,000	106.00	5,512,000	25,000	154.00	3,850,000
Ohio	901,000	126.00	113.526.000	24,000	127.00	3,048,000
Indiana	838,000	118.00	98,884,000	84,000	124.00	10,416,000
Illinois	1,497,000	115.00	172,155,000	151,000	123.00	18,573,000
Michigan	634,000	131.00	83,054,000	4,000	135.00	540,000
Wisconsin	652,000	124.00	80,848,000	3,000	125.00	375,000
Minnesota	806,000	116.00	93,496,000	6,000	119.00	714,000
Iowa	1,558,000	113.00	177,184,000	57,000	119.00	6,783,000
Missouri	1,095,000	102.00	111,690,000	333,000	115.00	38,295,000
North Dakota	691,000	114.00	78,774,000	8,000	127.00	1,016,000
South Dakota	675,000	92.00	62,100,000	13,000	108.00	1,404,000
Nebraska	1,059,000	91.00	96,369,000	85,000	106.00	9,010,000
Kansas	1,169,000	96.00	112,224,000	218,000	108.00	23,544,000
Kentucky	443,000	107.00	47,401,000	234,000	118.00	27,612,000
Tennessee	354,000	114.00	40,356,000	279,000	123.00	34,317,000
Alabama	143,000	99.00	14,157,000	265,000	127.00	33,655,000
Mississippi	234,000	89.00	20,826,000	277,000	113.00	31,301,000
Louisiana	187,000	79.00	14,773,000	134,000	116.00	15,544,000
Texas	1,158,000	74.00	85.692,000	703,000	104.00	73,112,000
Oklahoma	750,000	76.00	57,000 000	272,000	98.00	26,656,000
Arkansas	265,000	86.00	22,790,000	228,000	110.00	25,080,000
Montana	347,000	87.00	30,189,000	4,000	107.00	364,000
Wyoming	159,000	69.00	10,971,000	2,000	99.00	198,000
Colorado	321,000	80.00	25.680,000	17,000	100.00	1,700,000
New Mexico	185,000	50.00	9,250,000	15,000	86.00	1,290,000
Arizona	104,000	69.00	7,176,000	4,000	118.00	472,000
Utah	131,000	93.00	12,183,000	2,000	85.00	170,000
Nevada	72,000	77.00	5,544,000	3,000	82.00	246,000
Idaho	214,000	96.00	20,544,000	4,000	112.00	448,000
Washington	293,000	107.00	31,351,000	14,000	112.00	1,568,000
Oregon	289,000	102.00	29,478,000	10,000	112.00	1,110,000
California	493,000	117.00	57,681,000	72,000	136.00	9,792,000
United States	20,509,000	$105.94	$2,172,694,000	4,362,000	$120.51	$525,657,000

TABLE VI

AVERAGE WEIGHTS OF FEEDING STUFFS

As a rule it is not practicable to weigh each ration, nor is it necessary in practice, as measuring is sufficiently accurate. To aid in approximating the weights of the various foods, the following table of weights and measures is made up from Farmer's Bulletin, No. 222:

Feeding stuffs	One quart weighs	One pound measures
	Pounds	Quarts
Corn, whole	1.7	0.6
Corn, meal	1.5	0.7
Corn, bran	0.5	2.0
Corn and cob meal	1.4	0.7
Gluten meal	1.7	0.6
Gluten feed	1.3	0.8
Germ meal	1.4	0.7
Hominy meal	1.1	0.9
Distiller's dried grains	0.6	1.2
Wheat, whole	2.0	0.5
Wheat, ground	1.7	0.5
Wheat, bran	0.5	2.0
Wheat middlings (standard)	0.8	1.3
wheat middlings (flour)	1.2	0.8
Buckwheat middlings	1.3	0.8
Oats, whole	1.0	1.0
Oats, ground	0.7	1.4
Rye, whole	1.7	0.6
Rye, meal	1.5	0.7
Rye, bran	0.6	1.8
Barley, whole	1.5	0.7
Barley, meal	1.1	0.9
Brewer's dried grains	0.6	1.7
Malt sprouts	0.6	1.7
Linseed meal, old process	1.1	0.9
Linseed meal, new process	0.9	1.1
Cottonseed meal	1.5	0.7

TABLE VII

ENERGY VALUE AND DIGESTIBLE NUTRIENTS IN FEEDING STUFFS

In choosing foods and computing rations for farm animals by the use of the energy values, it is necessary

to know the digestible protein and energy value of the feeds used. The following table is from Farmers' Bulletin No. 346, and contains the dry matter as well as the digestible protein and energy values of each of the more common feeding stuffs.

Dry Matter, Digestible Protein, and Energy Values Per 100 Pounds

Feeding stuff	Total dry matter	Digestible protein	Energy value
Green fodder and silage:	*Pounds*	*Pounds*	*Therms*
Alfalfa	28.2	2.50	12.45
Clover—crimson	19.1	2.19	11.30
Clover—red	29.2	2.21	16.17
Corn fodder—green	20.7	0.41	12.44
Corn silage	25.6	1.21	16.56
Hungarian grass	28.9	1.33	14.76
Rape	14.3	2.16	11.43
Rye	23.4	1.44	11.63
Timothy	38.4	1.04	19.08
Hay and dry coarse fodders:			
Alfalfa hay	91.6	6.93	34.41
Clover hay—red	84.7	5.41	34.74
Corn forage, field cured	57.8	2.13	30.53
Corn stover	59.5	1.80	26.53
Cowpea hay	89.3	8.57	42.76
Hungarian hay	92.3	3.00	44.03
Oat hay	84.0	2.59	36.97
Soy bean hay	88.7	7.68	38.65
Timothy hay	86.8	2.05	33.56
Straws:			
Oat straw	90.8	1.09	21.21
Rye straw	92.9	0.63	20.87
Wheat straw	90.4	0.37	16.56
Roots and tubers:			
Carrots	11.4	0.37	7.82
Mangel-wurzels	9.1	0.14	4.62
Potatoes	21.1	0.45	18.05
Rutabagas	11.4	0.88	8.00
Turnips	9.4	0.22	5.74
Grains:			
Barley	89.1	8.37	80.75
Corn	89.1	6.79	88.84
Corn-and-cob meal	84.9	4.53	72.05
Oats	89.0	8.36	66.27
Pea meal	89.5	16.77	71.75
Rye	88.4	8.12	81.72
Wheat	89.5	8.90	82.63
By-products:			
Brewer's grains—dried	92.0	19.04	60.01
Brewer's grains—wet	24.3	3.81	14.82
Buckwheat middlings	88.2	22.34	75.92
Cottonseed meal	91.8	35.15	84.20

TABLE VII—*Continued*

Feeding stuff	Total dry matter	Digestible protein	Energy value
By-products—Continued			
Distiller's grains—dried—			
Principally corn	93.0	21.93	79.23
Principally rye	93.2	10.38	60.93
Gluten feed—dry	91.9	19.95	79.32
Gluten meal—Buffalo	91.8	21.56	88.80
Gluten meal—Chicago	90.5	33.09	78.49
Linseed meal—old process	90.8	27.54	78.92
Linseed meal—new process	90.1	29.26	74.67
Malt sprouts	89.8	12.36	46.33
Rye bran	88.2	11.35	56.65
Sugar-beet pulp—fresh	10.1	0.63	7.77
Sugar-beet pulp—dried	93.6	6.80	60.10
Wheat bran	88.1	10.21	48.23
Wheat middlings	84.0	12.79	77.65

TABLE VIII

DIGESTIBLE NUTRIENTS AND FERTILIZING CONSTITUENTS IN FEEDING STUFFS

In choosing foods for a ration, the digestible nutrients should be known, as it is the digestible part only that is of use to the animal. The following table is adapted from Henry's "Feeds and Feeding," eleventh edition, and gives a very complete list of American feeding stuffs, their digestible nutrients and fertilizing constituents:

AVERAGE DIGESTIBLE NUTRIENTS AND FERTILIZING CONSTITUENTS

Name of feed	Total dry matter in 100 pounds	Digestible nutrients in 100 pounds			Fertilizing constituents in 1,000 pounds		
		Crude protein	Carbohydrates	Fat	Nitrogen	Phosphoric acid	Potash
CONCENTRATES							
Grains, seeds and their parts	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Dent corn	89.4	7.8	66.8	4.3	16.5	7.1	5.7
Flint corn	88.7	8.0	66.2	4.3	16.8	7.1	5.7
Sweet corn	91.2	8.8	63.7	7.0	18.6	7.1	5.7
Corn meal	85.0	6.1	64.3	3.5	14.7	6.3	4.7
Corn cob	89.3	0.5	44.8	....	3.9	0.6	6.0
Corn-and-cob meal	84.9	4.4	60.0	2.9	13.6	5.7	4.7

TABLE VIII—*Continued*

Name of feed	Total dry matter in 100 pounds	Digestible nutrients in 100 pounds			Fertilizing constituents in 1,000 pounds		
		Crude protein	Carbohydrates	Fat	Nitrogen	Phosphoric acid	Potash
Concentrates—Continued	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Gluten meal	90.5	29.7	42.5	6.1	54.8	3.3	0.5
Gluten feed	90.8	21.3	52.8	2.9	40.0	3.7	0.4
Hominy feed (chop)	90.4	6.8	60.5	7.4	16.8	9.8	4.9
Germ oil meal	91.4	15.8	38.8	10.8	34.7	3.9	2.1
Corn bran	90.6	6.0	52.5	4.8	17.9	10.1	6.2
Wheat	89.5	8.8	67.5	1.5	19.0	5.5	8.7
High grade flour	87.6	10.6	65.1	1.0	19.2	5.7	5.4
Red dog flour	90.1	16.2	57.0	3.4	29.4	....	....
Flour wheat middlings	90.0	16.9	53.6	4.1	30.7	12.2	9.6
Standard wheat middlings (shorts)	88.8	13.0	45.7	4.5	27.0	26.3	15.3
Wheat bran, all analyses	88.1	11.9	42.0	2.5	24.6	26.9	15.2
Winter wheat bran	88.5	12.1	37.1	2.8	25.1	....	....
Spring wheat bran	88.0	11.9	43.1	3.1	25.1	....	....
Wheat feed	89.1	12.7	47.1	4.0	26.1	20.4	5.4
Wheat screenings	88.4	9.6	48.2	1.9	20.0	11.7	8.4
Rye	91.3	9.5	69.4	1.2	18.1	8.6	5.8
Rye flour	86.9	5.6	72.2	0.5	10.7	8.2	6.5
Rye middlings	88.2	11.0	52.9	2.6	22.9	12.3	9.6
Rye bran	88.4	11.2	46.8	1.8	23.3	22.8	14.0
Rye feed	87.6	12.6	56.6	2.8	25.1	7.7	4.7
Barley	89.2	8.4	65.3	1.6	19.2	7.9	4.8
Barley screenings	87.8	9.5	49.9	2.5	19.7	....	....
Barley feed	91.1	11.5	60.3	2.9	22.1	6.6	3.4
Emmer (speltz)	92.0	10.0	70.3	2.0	18.4	7.6	5.7
Oats	89.6	8.8	49.2	4.3	18.2	7.8	4.8
Ground oats	88.0	10.1	52.5	3.7	19.7	7.6	5.0
Oat meal	92.1	11.9	65.1	6.7	23.5	....	....
Oat middlings	91.2	13.1	57.7	6.5	25.9	22.5	15.3
Oat feed	93.0	5.2	30.1	2.6	12.8	6.1	7.2
Oat dust	93.5	5.1	32.8	2.3	21.6	....	....
Oat hulls	92.6	1.3	38.5	0.6	5.3	1.6	4.9
Buckwheat	86.6	8.1	48.2	2.4	17.3	6.9	3.0
Buckwheat flour	85.4	5.9	63.0	1.2	11.0	6.8	3.4
Buckwheat middlings	87.2	22.7	37.5	6.1	42.7	12.3	11.4
Buckwheat bran	91.8	5.9	34.0	2.0	20.2	4.2	12.7
Buckwheat feed	88.4	15.6	38.2	4.4	29.3	15.8	10.5
Buckwheat hulls	86.8	1.2	28.6	0.5	7.3	4.3	14.7
Rice	87.6	6.4	79.2	0.4	11.8	1.8	0.9
Rice meal	89.8	7.4	48.3	11.9	19.2	....	....
Rice polish	89.2	7.9	58.6	5.3	19.0	26.7	7.1
Rice bran	90.3	7.6	38.8	7.3	19.0	2.9	2.4
Rice hulls	91.2	0.3	19.9	0.7	5.1	1.7	1.4
Canada field pea	85.0	19.7	49.3	0.4	37.9	8.4	10.1
Canada field pea meal	89.5	16.8	51.7	0.7	32.3	8.2	9.9
Canada field pea bran	89.0	7.7	41.6	0.6	16.0	3.1	10.3
Table bean meal	89.1	20.2	42.3	1.3	37.1	12.0	12.9
Cowpea	85.4	16.8	54.9	1.1	32.8	10.1	12.0
Soy bean	88.3	29.1	23.3	14.6	53.6	10.4	12.6

TABLE VIII *Continued*

Name of feed	Total dry matter in 100 pounds	Digestible nutrients in 100 pounds			Fertilizing constituents in 1,000 pounds		
		Crude protein	Carbohydrates	Fat	Nitrogen	Phosphoric acid	Potash
Concentrates—Continued	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Horse bean	88.7	23.1	49.8	0.8	17.6	4.0	12.9
Kafir corn	90.4	5.2	71.3	1.4	17.9	..	..
Ground kafir corn heads	86.4	4.3	69.1	1.2	14.7	..	..
Sorghum seed	87.9	1.8	61.1	2.8	14.6	8.1	3.1
Milo maize seed	91.0	4.9	74.8	1.3	17.1	..	..
Ground milo maize heads	90.3	4.2	48.0	1.1	14.7	..	..
Broom-corn seed	87.9	4.6	19.2	1.8	15.8	7.2	5.2
Millet seed	87.9	7.1	18.5	2.5	14.1	6.5	3.3
Hungarian grass seed	90.8	6.1	18.8	3.3	15.8	4.7	3.8
Flax seed	90.8	20.6	17.1	29.0	36.3	13.9	10.3
Linseed meal, old process	90.2	30.2	32.0	6.9	51.9	16.6	13.7
Linseed meal, new process	91.0	31.5	35.7	2.1	60.0	17.1	13.1
Cottonseed	89.7	19.5	30.0	17.3	29.1	10.8	10.9
Cottonseed, roasted	93.9	7.9	25.5	19.9	26.9	..	..
Cottonseed meal	93.0	37.6	21.1	9.6	72.5	30.4	15.8
Cottonseed hulls	88.9	0.3	33.2	1.7	6.7	1.3	10.1
Palmnut cake	89.6	16.0	53.6	9.0	26.9	11.0	5.0
Cocoanut cake	89.7	15.1	11.2	10.7	31.5	16.0	21.0
Sunflower seed	91.1	14.8	29.7	18.2	26.1	13.2	5.6
Sunflower-seed cake	89.2	29.5	25.3	8.0	52.5	21.5	11.7
Peanut kernels, without hulls	93.5	25.1	13.7	35.6	11.6	13.1	12.7
Peanut cake	89.3	12.8	20.1	7.2	26.2	20.0	15.0
Rape seed cake	90.0	25.3	23.7	7.6	49.9	20.0	13.0
Sesame oil cake	92.6	33.0	10.9	23.1	58.7	32.7	14.5
Factory by-products							
Dried brewer's grains	91.3	20.0	33.2	6.0	10.0	16.1	2.0
Wet brewer's grains	23.0	1.9	9.4	1.7	10.7	1.2	0.5
Malt sprouts	90.8	20.3	16.0	1.4	12.1	17.4	10.9
Dried distiller's grains	92.1	22.8	29.7	11.6	19.9	6.0	1.7
Apple pomace	17.0	0.6	13.1	0.5	1.6	0.1	0.3
Cassava starch refuse	88.0	0.1	71.0	0.6	1.9	0.6	2.8
Starch refuse	88.0	2.1	70.6	1.1	7.6	2.9	1.5
Wet starch feed	31.2	3.7	12.4	2.6	8.0	0.8	0.2
Potato pomace	7.3	0.4	6.8	0.1	0.9	0.2	0.9
Bakery refuse	87.0	7.0	58.8	4.8	13.8	..	..
Wet beet pulp	10.2	0.5	7.7	.	1.1	0.3	11.1
Dried beet pulp	91.6	4.1	64.9	.	13.9	2.2	3.1
Sugar beet molasses	79.2	4.7	54.1	.	14.5	0.5	56.3
Porto Rico molasses	74.1	4.1	59.2	..	4.3	1.2	36.8
Dried molasses beet pulp	92.0	6.1	68.7	..	15.4	1.5	18.1
Molasses grains	89.6	10.8	48.0	2.2	24.1	8.5	21.1
Alfalmo	90.9	9.8	40.8	0.9	20.9	..	..
Cow's milk	12.8	3.1	4.8	3.7	5.8	1.9	1.7
Cow's milk, colostrum	25.4	17.6	2.7	3.6	18.9	6.6	1.1
Skim milk	9.4	2.9	5.3	0.3	5.0	2.1	2.0
Buttermilk	9.9	3.8	3.9	1.0	6.1	1.7	1.6

TABLE VIII—*Continued*

Name of feed	Total dry matter in 100 pounds	Digestible nutrients in 100 pounds			Fertilizing constituents in 1,000 pounds		
		Crude protein	Carbohydrates	Fat	Nitrogen	Phosphoric acid	Potash
Concentrates—Continued	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Whey	6.2	0.6	5.0	0.2	1.0	1.1	2.0
Meat scrap	89.3	66.2	....	13.4	114.0	81.1	....
Meat and bone meal	94.0	36.7	5.5	10.6	63.2	146.8	....
Dried blood	91.5	70.9	....	2.5	135.0	13.5	7.7
Tankage	93.0	50.1	....	11.6	86.2	139.0	3.0
Dried fish	89.2	45.0	....	11.4	77.4	140.0	3.0
DRIED ROUGHAGE							
Field-cured corn forage							
Fodder corn, ears, if any remaining	57.8	2.5	34.6	1.2	7.2	5.4	8.9
Corn stover, ears removed	59.5	1.4	31.2	0.7	6.1	3.8	10.9
Corn husks	49.1	0.8	33.8	0.2	4.0	....	....
Corn leaves	70.0	2.8	37.8	0.8	9.8	....	....
Sweet corn forage	60.0	3.4	36.2	1.1	9.8	4.0	....
Cured hay from the grasses, etc.							
English hay	86.0	4.5	44.0	1.2	12.6	3.2	16.1
Hay from mixed grasses	84.7	4.2	42.0	1.3	11.9	2.7	15.5
Timothy, all analyses	86.8	2.8	42.4	1.3	9.4	3.3	14.2
Timothy, cut in full bloom	85.0	3.4	43.3	1.4	9.6	5.0	14.1
Timothy, cut soon after bloom	85.8	2.5	39.2	1.5	9.1	....	....
Timothy, cut nearly ripe	85.9	2.1	40.1	1.1	8.0	....	....
Meadow foxtail	93.4	5.3	41.0	1.3	14.9	....	....
Orchard grass	90.1	4.9	42.4	1.4	12.9	3.7	16.9
Red top	91.1	4.8	46.9	1.0	12.6	3.6	10.2
White top	86.0	6.8	40.6	1.5	17.9	....	....
Meadow fescue	80.0	4.2	36.9	1.5	11.2	4.0	21.0
Kentucky blue grass	86.0	4.4	40.2	0.7	12.5	4.0	15.7
Tall oat	86.0	3.3	41.4	1.1	10.3	....	....
Italian rye grass	91.5	4.5	43.4	0.9	12.0	7.6	24.6
Perennial rye grass	86.0	6.1	37.8	1.2	16.2	7.4	24.1
Rowen hay	86.0	7.9	42.2	1.4	18.2	4.3	14.9
Bermuda grass	92.9	6.4	44.9	1.6	17.1	....	....
Johnson grass	89.8	2.9	45.6	0.8	11.5	....	....
Macaroni wheat	93.0	4.4	48.7	0.8	10.9	....	....
Barley	85.0	5.7	43.6	1.0	14.1	....	....
Oat	86.0	4.7	36.7	1.7	14.2	6.7	25.4
Emmer (speltz)	93.4	7.0	43.9	0.6	17.1	....	....
Barnyard millet	86.0	5.2	38.6	0.8	16.9	4.3	28.8
Cat-tail millet	89.0	7.2	41.6	1.0	18.5	....	....
Hungarian grass	86.0	5.0	46.9	1.1	12.1	4.3	15.4
Wild oat grass	85.7	2.9	48.7	1.7	8.0	....	....
Prairie grass	90.8	3.0	42.9	1.6	9.9	....	....

TABLE VIII—*Continued*

Name of feed	Total dry matter in 100 pounds	Digestible nutrients in 100 pounds			Fertilizing constituents in 1,000 pounds		
		Crude protein	Carbohydrates	Fat	Nitrogen	Phosphoric acid	Potash
Dried Roughage—Continued	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Buffalo grass	85.0	3.0	42.0	1.6	7.1	....	....
Gama grass	85.7	4.2	39.9	0.9	11.8	....	....
Texas blue grass	85.7	5.1	36.3	1.4	14.6	....	....
Guinea grass	....	3.3	47.2	0.5	8.8	....	....
Para grass	....	5.5	45.6	0.6	14.6	....	....
Swamp grass	88.4	4.0	38.9	0.7	11.5	....	....
Salt marsh grass	89.6	3.1	39.7	0.9	8.8	2.5	7.2
Buttercups	90.7	4.8	40.7	1.8	15.9	....	....
Ox-eye daisy	89.7	3.7	41.0	1.7	12.3	4.4	12.5
Australian salt bush	93.0	3.8	28.8	0.7	18.6	5.9	21.3
Cured hay from legumes and mixed legumes and grasses							
Red clover	84.7	7.1	37.8	1.8	19.7	5.5	18.7
Red clover in bloom	79.2	7.7	34.0	2.8	19.9	....	....
Mammoth red clover	78.8	6.2	34.7	2.1	17.1	5.2	11.6
Alsike clover	90.3	8.4	39.7	1.1	20.5	5.0	13.9
White clover	90.3	11.5	42.2	1.5	25.1	7.8	13.2
Crimson clover	90.4	10.5	34.9	1.2	24.3	4.0	13.1
Japan clover	89.0	9.1	37.7	1.4	22.1	....	....
Sweet clover	92.1	11.9	36.7	0.5	28.8	5.6	18.3
Soy bean	88.2	10.6	40.9	1.2	23.8	....	....
Cowpea	89.5	9.2	39.3	1.3	14.3	5.2	14.7
Alfalfa	91.9	10.5	40.5	0.9	23.4	6.1	17.9
Alfalfa leaves	95.1	16.8	35.9	1.3	37.3	....	....
Bur clover	91.0	8.2	39.0	2.1	21.8	....	....
Hairy (winter) vetch	88.7	11.9	40.7	1.6	27.2	9.7	24.4
Serradella	90.8	11.4	38.6	1.7	24.3	7.4	26.3
Peanut pine	92.4	6.7	42.2	3.0	17.1	3.2	11.6
Velvet bean	90.0	9.6	52.2	1.4	22.4	....	....
Beggar weed	90.8	6.8	42.8	1.6	18.9	....	....
Sanfoin	85.0	10.4	36.5	2.0	23.7	5.0	14.7
Wheat and vetch	85.0	10.6	36.8	1.2	23.2	....	....
Oat and pea	89.5	7.6	41.5	1.5	16.5	6.1	18.1
Oat and vetch	85.0	8.3	35.8	1.3	20.5	6.0	12.7
Mixed grasses and clover	87.1	5.8	41.8	1.3	16.2	....	....
Mixed rowen	83.4	8.0	40.1	1.5	18.6	....	....
Straw and chaff							
Wheat	90.4	0.8	35.2	0.4	5.0	2.2	6.3
Rye	92.9	0.7	39.6	0.4	5.0	2.5	8.6
Oat	90.8	1.3	39.5	0.8	5.8	3.0	17.7
Barley	85.8	0.9	40.1	0.6	7.0	2.0	10.6
Millet	85.0	0.9	34.3	0.6	6.5	1.8	17.3
Buckwheat	90.1	1.2	37.4	0.5	8.0	1.3	11.4
Field bean	95.0	3.6	39.7	....	....	....	....

TABLE VIII—*Continued*

Name of feed	Total dry matter in 100 pounds	Digestible nutrients in 100 pounds			Fertilizing constituents in 1,000 pounds		
		Crude protein	Carbo-hy. drates	Fat	Nitro-gen	Phos-phoric acid	Potash
Dried Roughage—Continued	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Soy bean	89.9	2.3	40.1	1.0	6.8	2.5	10.4
Horse bean	90.8	4.3	39.5	0.8	14.1	....	....
Wheat chaff	85.7	1.2	25.4	0.6	7.2	3.8	8.2
Oat chaff	85.7	1.5	33.0	0.7	6.4	1.4	4.5
Flax chives	90.0	1.2	34.4	1.0	8.1	....	....
Sorghum bagasse	88.8	0.5	52.2	0.7	5.5	....	....
Green corn and sorghum forage							
Fodder corn, all varieties	20.7	1.0	11.9	0.4	2.9	1.1	3.9
Dent varieties	21.0	0.9	12.2	0.4	2.7	....	....
Dent, kernels glazed	26.6	1.1	15.0	0.7	3.2	....	....
Flint varieties	20.2	1.1	11.4	0.5	3.2	1.3	3.1
Flint, kernels glazed	22.9	1.5	13.2	0.6	4.3	....	....
Sweet varieties	20.9	1.2	12.6	0.4	3.4	1.4	3.8
Sweet corn, without ears	20.0	0.7	11.6	0.4	2.2	....	....
Red kafir corn	18.4	0.8	9.7	0.4	2.9	1.3	4.5
White kafir corn	16.6	0.8	8.3	0.5	3.0	1.2	5.0
Teosinte	9.9	0.9	4.9	0.2	2.2	0.6	9.2
Yellow milo maize	16.8	1.1	9.3	0.3	2.7	1.1	5.7
Sorghum fodder	20.6	0.6	11.6	0.3	2.1	0.7	3.4
Sugar cane	15.8	0.5	9.5	0.3	1.9	0.9	4.4
Fresh green grasses							
Pasture grass	20.0	2.5	10.1	0.5	5.6	2.6	7.4
Kentucky blue grass	34.9	2.8	19.7	0.8	6.6	....	....
Timothy	38.4	1.5	19.9	0.6	5.0	2.6	7.6
Orchard grass	27.0	1.2	13.4	0.5	4.2	1.6	7.6
Red top, in bloom	34.7	1.9	21.3	0.5	4.5	....	....
Wheat forage	22.7	1.7	12.0	0.4	3.8	1.6	6.0
Rye forage	23.4	2.1	14.1	0.4	4.2	2.5	7.1
Oat forage, stage uncertain	25.0	2.6	11.0	0.6	5.6	....	....
Oat forage, in milk	37.8	2.5	18.2	1.0	5.4	1.3	3.8
Oat forage, in bloom	25.0	1.1	12.4	0.5	2.6	....	....
Barley forage	21.0	1.9	10.4	0.3	4.3	....	....
Meadow fescue	30.1	1.6	18.6	0.5	3.8	....	....
Italian rye grass	26.8	1.5	12.6	0.7	5.0	2.9	11.4
Tall oat grass	30.5	1.2	15.7	0.5	3.8	....	....
Johnson grass	25.0	0.6	13.7	0.2	1.9	....	....
Bermuda grass	28.3	1.3	13.4	0.4	3.5	....	....
Hungarian grass	28.9	2.0	15.9	0.4	5.0	1.2	4.2
Japanese millet	25.0	1.1	13.6	0.3	3.4	2.0	3.4
Barnyard millet	25.0	1.6	14.4	0.3	3.8	1.1	5.8
Pearl millet	18.5	0.6	10.0	0.2	1.9	1.5	7.1
Common millet	20.0	0.8	11.0	0.2	2.4	0.7	4.7
Hog millet	20.0	0.8	10.8	0.3	2.4	....	....

TABLE VIII—*Continued*

Name of feed	Total dry matter in 100 pounds	Digestible nutrients in 100 pounds			Fertilizing constituents in 1,000 pounds		
		Crude protein	Carbohydrates	Fat	Nitrogen	Phosphoric acid	Potash
Dried Roughage—Continued	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Fresh green legumes, grasses and legumes combined							
Red clover	29.2	2.9	13.6	0.7	7.0	1.5	4.8
Mammoth red clover	20.0	2.0	9.1	0.2	4.8	....	....
Alsike clover	25.2	2.6	11.4	0.5	6.2	1.1	2.0
Crimson clover	19.1	2.4	9.1	0.5	5.0	1.2	4.0
Sweet clover	20.0	2.5	8.4	0.4	6.1	2.4	6.7
Alfalfa	28.2	3.6	12.1	0.4	7.7	1.3	5.6
Spring vetch	15.0	1.9	6.6	0.2	4.3	1.0	4.5
Cowpea	16.4	1.8	8.7	0.2	3.8	1.3	4.6
Hairy vetch, winter	15.0	2.8	6.4	0.3	5.8	1.4	5.2
Hairy vetch, in bloom	18.0	3.5	7.7	0.3	6.7	....	....
Soy bean	24.9	3.1	11.0	0.5	6.4	1.4	5.6
Serradella	20.5	2.1	8.9	0.4	4.3	1.6	5.5
Horse bean	15.8	2.3	7.3	0.2	4.5	0.5	2.1
Velvet bean	17.8	2.7	8.4	0.4	5.6	....	....
Sanfoin	25.0	2.9	11.1	0.5	7.0	1.4	5.7
Canada field pea	15.3	1.8	6.9	0.3	4.5	1.6	5.0
Canada field pea, in bud	15.0	2.6	6.8	0.3	5.0	1.1	4.4
Canada field pea, in bloom	13.0	2.3	5.3	0.2	4.5	1.1	3.2
Canada field pea, in pod	16.0	1.9	7.0	0.2	3.7	1.3	3.7
Barley and vetch	20.0	2.1	6.5	0.3	4.5	2.0	5.7
Barley and peas	20.0	2.1	9.1	0.4	4.5	....	....
Oats and peas	20.3	1.8	10.2	0.4	3.8	1.5	5.0
Oats and vetch	20.0	2.3	10.0	0.2	4.8	1.4	3.0
Wheat and vetch	20.0	2.6	10.3	0.3	5.4	....	....
Mixed grass and clover	25.0	2.3	14.6	0.5	4.6	....	....
Roots and tubers							
Potato	20.9	1.1	15.7	0.1	3.4	1.6	5.8
Common beet	11.5	1.2	7.9	0.1	2.4	0.8	4.8
Mangel	9.1	1.0	5.5	0.2	2.2	0.9	3.8
Sugar beet	13.5	1.3	9.8	0.1	2.9	0.8	3.7
Flat turnip	9.9	0.9	6.4	0.1	2.1	0.9	3.4
Carrot	11.4	0.8	7.7	0.3	1.8	0.9	2.6
Rutabaga	11.4	1.0	8.1	0.2	1.9	1.2	4.9
Parsnip	11.7	1.1	10.1	0.2	2.6	2.0	4.4
Artichoke	20.5	1.3	14.7	0.2	4.2	1.4	4.7
Sweet potato	28.9	0.8	22.9	0.3	2.4	0.8	3.7
Chufa	20.5	0.6	9.1	5.6	....	....	....
Cassava	34.0	0.8	28.9	0.2	2.0	1.0	4.0
Miscellaneous							
Acorns	44.7	2.1	34.4	1.7	4.0	....	....
Apples	22.2	0.8	16.5	0.2	1.2	0.1	1.7

TABLE VIII—*Continued*

Name of feed	Total Dry matter in 100 pounds	Digestible nutrients in 100 pounds			Fertilizing constituents in 1,000 pounds		
		Crude protein	Carbohydrates	Fat	Nitrogen	Phosphoric acid	Potash
Dried Roughage—Continued	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Dwarf Essex rape	14.3	2.0	8.2	0.2	3.5	1.2	3.5
Dwarf Essex rape, summer, southern states	15.0	1.9	8.6	0.2	3.4	....	....
Dwarf Essex rape, winter, southern states	15.0	2.0	8.1	0.2	3.7	....	....
Cabbage	10.0	2.3	5.9	0.1	4.2	1.1	4.3
Sugar beet leaves	12.0	1.9	5.0	0.2	4.2	1.5	6.2
Field pumpkin	9.1	1.0	5.8	0.2	2.1	....	....
Garden pumpkin	19.2	1.4	8.3	0.4	2.9	1.6	0.9
Prickly pear	15.8	0.4	6.2	0.2	1.1	0.2	3.7
Cane cacti	21.5	0.9	11.1	0.4	2.3	0.6	3.5
Dried banana tops	....	4.4	36.6	0.8	21.1	....	....
Dried banana butts	....	2.1	37.1	0.9	10.2	....	....
Spurry	20.0	1.5	9.8	0.3	3.8	2.5	5.9
Prickly comfrey	13.0	1.7	5.1	0.2	3.7	1.2	7.6
Purslane	9.0	2.0	4.5	0.1	3.7	....	....
Dandelion	15.7	1.1	7.5	2.0	1.9	....	....
Greasewood	95.5	10.9	40.9	1.8	....	....	....
Common little sage	65.0	3.2	19.7	0.9	21.9	....	....
Common sage	50.4	1.2	14.1	3.8	7.4	....	....
Australian salt bush	22.0	2.0	8.5	0.3	4.4	1.4	5.0
Dried oak leaves, gathered in July	95.1	3.2	34.6	1.6	15.2	....	....
Dried mixed tree leaves, gathered in July	84.0	3.5	30.4	1.1	16.8	....	....
Dried beech twigs, gathered in winter	84.7	0.9	21.8	0.6	6.4	....	....
Silage							
Corn, early analyses	20.9	0.9	11.4	0.6	2.7	1.1	3.7
Corn, recent analyses	26.4	1.4	14.2	0.7	4.3	1.1	3.7
Corn, ears removed	26.3	1.1	14.9	0.7	3.5	....	....
Sorghum	23.9	0.1	13.5	0.2	1.3	1.5	1.9
Millet	26.0	0.2	13.1	0.6	2.7	1.4	6.2
Rye	19.2	0.7	9.0	0.2	3.8	....	....
Red clover	28.0	1.5	9.2	0.5	6.7	....	....
Canada field pea	49.9	3.4	25.5	1.0	9.4	....	....
Soy bean	25.8	2.7	9.6	1.3	6.6	1.6	7.5
Cowpea vine	20.7	1.5	8.6	0.9	4.3	1.5	4.6
Brewer's grains	29.7	4.6	11.5	1.8	10.1	4.2	0.5
Apple pomace	15.0	0.7	9.6	0.5	1.9	1.5	4.0
Corn cannery refuse, husk	16.2	0.4	10.1	0.4	2.2	....	....
Corn cannery refuse, cobs	25.9	0.3	13.7	0.9	2.4	....	....
Pea cannery refuse	23.2	2.1	13.1	0.8	4.5	....	....
Cowpea and soy bean	30.2	2.2	12.9	0.8	6.1	....	....
Corn and soy bean	24.0	1.6	13.2	0.7	4.0	1.5	3.6
Barnyard millet and soy bean	21.0	1.6	9.2	0.7	4.5	1.1	4.4

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